ARCHITECTURAL SPECIFICATIONS

Volume 2 of 3
Project Number: 23-006

Sherwood Library Renovations

VOLUME 2

London Public Library

1225 Wonderland Rd N,

London, Ontario, N6G 2V9

matter
architectural studio

300-1108 Dundas Street
London, Ontario, N5W 3A7

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1.1 BARRIERS AND ENCLOSURES - GENERAL

.1 Provide temporary barriers and enclosures necessary to protect the public and building occupants and to secure Place of the Work during performance of the Work.
.2 Comply with applicable regulatory requirements.
.3 Maintain temporary barriers and enclosures in good condition for the duration of the Work.
.4 Remove temporary barriers and enclosures from Place of the Work when no longer required.

1.2 FENCING

.1 Erect temporary security and safety site fencing of type and height determined by Contractor, subject to applicable regulatory requirements.
.2 Erect temporary security and safety site fencing, minimum 1.8 m high, using self-supporting wire fence sections enclosing area of work as indicated on drawings. Maintain site fencing in good repair until removed.
.3 Provide lockable access gates as required to facilitate construction access.

1.3 EXTERIOR HOARDING

.1 Erect temporary exterior site hoarding to comply with applicable regulatory requirements and as follows:
  .1 Use lumber framing and, minimum 13 mm thick exterior grade plywood.
  .2 Paint public side of hoarding in colour selected by *Consultant* with one coat primer and one coat exterior paint. Maintain public side of hoarding clean and in good repair until removed.
  .3 Provide lockable access gates for *Construction Equipment* and lockable pedestrian doors as required to facilitate construction access.
  .4 Erect and maintain pedestrian walkways including roof and side covers, complete with pedestrian signage and electrical lighting.

1.4 WEATHER ENCLOSURES

.1 Provide weather tight enclosures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
.2 Provide weather enclosures to protect floor areas where walls are not finished and to enclose work areas that require temporary heating.
.3 Design weather enclosures to withstand wind pressure and snow loading requirements.

1.5 DUST TIGHT [SCREENS] [PARTITIONS]

.1 Provide dust tight insulated steel stud and gypsum board partitions with 6 MIL. Poly vapour barrier, all joints shall be taped to localize interior building areas from dust and noise generating activities.
.2 Erect, maintain, and relocate partitions as required to facilitate construction operations and Owner’s operational requirements.

1.6 FIRE ROUTES

.1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

1.7 PROTECTION OF BUILDING FINISHES

.1 Provide necessary temporary barriers and enclosures to protect [existing and] completed or partially completed finished surfaces from damage during performance of the Work.

END OF SECTION

Part 1 General

1.1 TEMPORARY CONTROLS - GENERAL

.1 Provide temporary controls as necessary for performance of the Work and in compliance with applicable regulatory requirements.
.2 Maintain temporary controls in good condition for the duration of the Work.
.3 Remove temporary controls and Construction Equipment used to provide temporary controls from Place of the Work when no longer required.

1.2 PLANT PROTECTION

.1 Protect trees and other plant material designated to remain on site and on adjacent properties where indicated on Drawings.
.2 Protect trees and shrubs susceptible to damage during construction by encasing with protective wood framework from grade to height of 1.8 metres.
.3 For trees designated to remain, protect roots inside dripline from disturbance or damage during excavation and grading. Avoid traffic, dumping and storage of materials over root zones.
.4 Minimize stripping of topsoil and vegetation.

1.3 DUST AND PARTICULATE CONTROL

.1 Implement and maintain dust and particulate control measures in accordance with applicable regulatory requirements.
.2 Execute Work by methods that minimize dust from construction operations and spreading of dust on site or to adjacent properties.
.3 Provide temporary enclosures to prevent extraneous materials resulting from sandblasting or similar operations from contaminating air beyond immediate work area.
.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
.5 Use appropriate covers on trucks hauling fine, dusty, or loose materials.

1.4 POLLUTION CONTROL

.1 Take measures to prevent contamination of soil, water, and atmosphere through uncontrolled discharge of noxious or toxic substances and other pollutants, potentially causing environmental damage.
.2 Be prepared, by maintaining appropriate materials, equipment, and trained personnel on site, to intercept, clean up, and dispose of spills or releases that may occur.
.3 Promptly report spills and releases that may occur to:
    .1 authority having jurisdiction,
    .2 person causing or having control of pollution source, if known, and
    .3 Owner and Consultant.
.4 Contact manufacturer of pollutant, if known and applicable, to obtain material safety data sheets (MSDS) and ascertain hazards involved and precautions and measures required in cleanup or mitigating actions.
.5 Take immediate action to contain and mitigate harmful effects of the spill or release.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Application Specialist: An individual who performs surface preparation and application of protective coatings and linings to steel and concrete surfaces of complex industrial structures.

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM)
- .1 ASTM A 53/A 53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- .2 ASTM A269M-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .3 ASTM A307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 CSA Group (CSA)
- .1 CSA G40.20-13/G40.21-, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16-14, Design of Steel Structures.
- .4 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59-13, Welded Steel Construction (Metal Arc Welding) Metric

.3 Environmental Choice Program (ECP)
- .1 CCD-048-95(2006), Surface Coatings - Recycled Water-borne

.4 Green Seal Environmental Standards (GS)
- .1 GS-11-2011, Paints and Coatings

.5 The Master Painters Institute (MPI)
- .1 Architectural Painting Specification Manual - current edition

.6 Underwriters Laboratories (UL)
- .1 UL 2768-11, Architectural Surface Coatings

.7 NACE International
- .1 NACE International
  - .1 ANSI/NACE No. 13/SSPC-ACS-1-2016-SG, Industrial Coating and Lining Application Specialist Qualification and Certification.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, and bolts and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit electronic copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

.4 Certificates:
- .1 Submit certifications for Application Specialists to demonstrate compliance to the requirements of ANSI/NACE No.13

1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Qualifications:
- .1 Ensure that 50% of industrial coating specialists persons, who perform concrete and steel surfaces preparation and coating applications, are certified by a recognized Applicator Certification Agency, in accordance with NACE 13 /SSPC ACS-I, Applicator Certification Standard (ACS).
- .2 Maintain a current and valid ACS certification during project period.
  - .1 Application specialists who perform surface preparation and coating application work on this project must have a current ACS.
- .3 Notify Consultant of any change in application specialist certification status.
  - .1 Any delays to the completion of the Project due to invalid certifications will not be considered, and liquidated damages shall not be waived for any non-performance by Contractor.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials off ground and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade300W.

.2 Steel pipe: to ASTM A53/A53M standard weight, galvanized finish.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series

.5 Bolts and anchor bolts: to ASTM A307
.6 Aluminum sheet: plain pattern, 3 mm minimum thickness, finish galvanized, colour as indicated on drawings.
.7 Stainless steel tubing: to ASTM A269, Type commercial grade, seamless welded with No. [4] finish.
.8 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
.3 Where possible, fit and shop assemble work, ready for erection.
.4 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to CAN/CSA-G164
.2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
.3 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of.
.4 Zinc primer: zinc rich, ready mix to MPI-INT 5.2C UL 2768.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:
  .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  .2 Concrete, mortar and masonry.
  .3 Wood.

2.5 SHOP PAINTING

.1 Primer: VOC limit 250 g/L maximum to GS-11.
.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Paint when temperature minimum 7 degrees C.
.4 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS

.1 Steel angles: prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.
.2 Weld or bolt back-to-back angles to profiles as indicated.
.3 Finish: shop painted.
  .1 Primer: VOC limit 250 g/L maximum to GS-11 when applied onsite.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions remedied after receipt of written approval to proceed from Consultant.

3.2 ERECTION - GENERAL

.1 Do welding work in accordance with CSA W59 unless specified otherwise
.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
.3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
.4 Exposed fastening devices to match finish and be compatible with material through which they pass.
.5 Supply components for work by other trades in accordance with shop drawings and schedule.
.6 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
.7 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
  .1 Primer: maximum VOC limit 250 g/L GS-11.
.8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
  .1 Primer: maximum VOC limit 250 g/L GS-11.

3.3 CLEANING

.1 Progress Cleaning:
  .1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with manufacturers written instructions.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.
.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Related work specified elsewhere:

Section 02 82 00.01	Asbestos Abatement – Type 1 Procedures
Section 02 82 00.02	Asbestos Abatement – Type 2 Procedures
Section 02 82 00.03	Asbestos Abatement – Type 3 Procedures
Section 02 83 10	Lead Abatement – Class 1 Procedures
Section 02 83 11	Lead Abatement – Class 2 Procedures
Section 02 84 16	Mercury Abatement
Section 02 85 10	Silica – Minimum Precautions
Section 02 85 11	Silica – Intermediate Precautions

.3 Site Conditions identifies all known hazardous building materials within the Project Area. The information provided is for general reference only. Each Contractor must confirm existing conditions on site prior to tender close.

.1 The specification fulfils the requirements of Section 30 of the Ontario Occupational Health and Safety Act.

.2 The specification fulfils the requirements of the Section 10 of Ontario Regulation 278/05.

.4 The Outline of Work identifies the location, condition and quantities of hazardous building materials to be removed as part of this project.

.1 It is the intent that work prescribed this Section will result in the removal of all hazardous materials as outlined and the decontamination of all surfaces or materials which may have been or become contaminated by hazardous materials either during or prior to work of this Contract.

1.2 Site Conditions

.1 Refer to the report entitled “REVISED Hazardous Building Materials Assessment (Pre-construction), London Public Library, Sherwood Forest Mall, 1225 Wonderland Road North, London, Ontario”, dated August 16, 2024, prepared by Pinchin Ltd., file number 344346.

1.3 Outline of Work

.1 Coordinate the following items with the Owner and the Construction Manager, including but not limited to electrical isolations, GFI connection, water connections, HVAC and exhaust ventilation system isolation, bin placement, schedule, disconnects, etc.

.2 Refer to the Contract Drawings prepared by others for the extent of construction work and the Work Areas.

.3 Using procedures prescribed in the Section identified in Related Work, remove and dispose of the following, where impacted, to accommodate the construction scope of work.

.1 Asbestos-containing texture finish present on drywall ceilings and bulkheads at the entrance of the library within the existing mall corridor.

.1 Include to remove and dispose of overspray from the asbestos-containing texture finish present above the ceilings/bulkheads at light fixture openings, on the deck, on concealed walls, ducts, pipes, conduits, within junction boxes, etc.

.2 Drywall with asbestos-containing drywall joint compound, fasteners, strapping hangers, studs, etc. from wall and ceiling finishes at the entrance of the library within the existing mall corridor.

.4 Use procedures prescribed in the Section identified in Related Work, when disturbing drywall with asbestos-containing joint compound including but not limited to installation and removal of items installed on or in wall and ceiling finishes.

.5 Use procedures prescribed in the Section identified in Related Work, when disturbing, handling, or removing, lead-containing paints/coatings/products, lamp tubes with mercury vapour, and building materials containing silica.

.6 Visit the site prior to tender close to confirm the location and extent of any hazardous building materials or materials contaminated by hazardous materials.

.7 Protect surfaces, building fabrics and items remaining within the Abatement Work Area.

.8 Without disturbing hazardous materials, perform removals where required, prior to abatement work.

.1 Maximize waste diversion by use of resale of building materials, or recycling.

.9 Isolate the Abatement Work Area from adjoining Occupied and Non-Occupied Areas whether present at an interior or exterior location.

.10 Maintain emergency and fire exits from Abatement Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.

.11 Remove, clean, store and replace at completion of work, non-operating mechanical and electrical equipment, ducts, building components, materials or items removed to accommodate asbestos removal.

.12 Perform selective demolition of mechanical and electrical equipment, building components, materials and items scheduled for demolition at locations required to facilitate asbestos removal. Refer to all Contract Documents for responsibility of demolition work and disposal.

.13 Remove and dispose of as appropriate waste, building components, materials and items contaminated by hazardous materials that cannot be effectively cleaned.

.14 Encapsulate remaining hazardous materials at locations where removal is deemed impractical by the Abatement Consultant.

.15 Final clean work area to remove visible signs of asbestos and other hazardous materials, other debris or settled dust.

.16 Apply lock-down agent to exposed surfaces throughout the work area and to surfaces from which any hazardous materials have been removed.

.1 Do not apply lock-down to materials which would be damaged by its application.

.17 Label mechanical systems and services to clearly identify location of remaining asbestos-containing materials.

.18 Unless otherwise specified, the handling, removal, clean-up or repair of hazardous materials or surfaces contaminated with hazardous materials is to be performed following wet removal techniques.

1.4 Schedule

.1 Provide necessary labour, supervision, equipment and materials to maintain and complete the project on schedule.

.2 Work Hours:

.1 Coordinate all work, scheduling and phasing with the Owner and the Construction Manager.

.2 Duration for which HVAC systems may remain shutdown to accommodate quiet hours work will vary in accordance with outside weather conditions and internal demand. Duration of quiet hours work will have to be scheduled accordingly and in consultation with the Abatement Consultant and Owner.

.3 Provide 48 hours written notice to the Abatement Consultant of any request to work outside normal working hours. Obtain written approval before proceeding.

1.5 Definitions

.1 Abatement Consultant: Owner's Representative providing inspection and air monitoring.

.2 Abatement Contractor: Contractor or sub-contractor performing work of this section.

.3 Abatement Work Area: Area where work takes place which will, or may, disturb hazardous materials.

.4 Amended Water: Water with wetting agent added for the purpose of reducing surface tension to allow thorough wetting of materials.

.5 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.6 Asbestos-Containing Material (ACM): Material identified under Site Conditions including any debris, overspray, fallen material and settled dust.

.7 Authorized Visitors: Building Owner, Abatement Consultant, or designated representative, and persons representing regulatory agencies.

.8 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act and has knowledge of the potential or actual danger to health and safety in the work.

.9 Contaminated Waste: Material identified under Site Conditions, including fallen material, settled dust, other debris and materials or equipment deemed to be contaminated by the Abatement Consultant.

.10 Curtained Doorway: Doorway consisting of two (2) overlapping flaps of rip-proof polyethylene arranged to permit ingress and egress from one room to another while permitting minimal air movement between rooms.

.11 DOP Test: A testing method used to determine the integrity of the Negative Pressure unit or vacuum using a Dispersed Oil Particulate (DOP) or Poly Alpha Olefin (PAO) HEPA filter leak test. This test is to be conducted on site where units are to be installed. Refer to the Environmental Abatement Council of Ontario (EACO) DOP/PAO Testing Guideline 2013 or ANSI/ASME N510-2007.

.12 Fitting: Individual segments or pieces of a mechanical service line which may include but is not limited to the hangers, tees, elbows, joints, valves, unions, etc.

.13 Friable Material: Material that when dry can be crumbled, pulverized or powdered by hand pressure and includes such material that is crumbled, pulverized or powdered.

.14 HEPA: High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.15 Lead-Containing: The Ontario Ministry of Labour (MOL) has not established a lower limit for concentrations of lead in paint, below which precautions do not need to be considered during construction projects. Pinchin follows the recommendations of the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair. The Guideline suggests that 0.1% (1,000 ppm) lead in paint represents a de minimis concentration of lead in paint for construction hygiene purposes, that is a concentration below which the lead content is not the limiting hazard in any disturbance of leaded paint for non-aggressive disturbance of painted finishes, (hand powered demolition, chipping, scraping, light sanding, etc.).

.16 Lead-containing: Paints containing lead at a concentration of 0.009% (90 ppm) or greater.

.17 Lead Waste: Waste generated from removal of lead-containing materials, or the substrate and paint finish where left intact.

.18 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.

.19 Milestone Inspection: Inspection of the Abatement Work Area at a defined point in the abatement operation.

.20 Negative Pressure: A reduced pressure within the Abatement Work Area (> 0.02 inches of water column) established by extracting air directly from Abatement Work Area and discharging it to exterior of building.

.21 Non-Friable Material: Material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.22 Occupied Area: Any area of the building or adjoining space outside the Abatement Work Area.

.23 Personnel: All Contractor's employees, sub-contractors employees, supervisors.

.24 PCM: Phase Contrast Microscopy.

.25 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).

.26 Toxicity Characteristic Leachate Procedure (TCLP): Laboratory analysis to determine leachable parameters in lead waste.

.27 TEM: Transmission Electron Microscopy.

1.6 Regulations and Guidelines

.1 Comply with Federal, Provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications, the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed.

.2 Where regulations are not present, follow accepted industry standards and applicable Guideline documents.

.3 Regulations and Guidelines include but are not limited to the following:

.1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.

.2 Ministry of the Environment and Climate Change Regulation for the disposal of waste, including R.R.O. 1990, Reg. 347 as amended.

.3 PCB Regulations, SOR 2008-273 and R.R.O. 1990, Reg 362.

.4 Regulation 490/09 Designated Substances.

.5 Environmental Abatement Council of Ontario (EACO), Lead Guideline For Construction, Renovation, Maintenance or Repair, October 2014.

.6 Ministry of Labour, Guideline, Silica on Construction Projects, 2011.

1.7 Quality Assurance

.1 Removal and handling of hazardous materials is to be performed by persons trained in the methods, procedures and industry practices for Abatement.

.2 Ensure work proceeds to schedule, meeting all requirements of this Specification.

.3 Complete work so that at no time airborne dust, visible debris, or water runoff contaminate areas outside the Abatement Work Area.

.4 Any contamination of surrounding area (indicated by visual inspection or air monitoring) shall necessitate the clean-up of affected area, and in the same manner applicable to an Abatement Work Area at no cost to the Owner.

.5 All work involving electrical, mechanical, carpentry, glazing, etc., shall be performed by licensed persons experienced and qualified for the work required.

1.8 Supervision

.1 Provide on site, an Overall Superintendent(s), who has authority to oversee all aspects of the work, including but not limited to, estimating and negotiation of changes to the contract, update of submission requirements, scheduling, manpower and equipment requirements, and direct communication and co-ordination with Abatement Consultant and Owner's representative.

.2 Provide on site, in addition to the Overall Superintendent(s), and for each work shift, a Shift Superintendent, who has authority regarding all aspects related to manpower, equipment and production.

.3 Provide on site for each work shift, a Shift Superintendent(s), who has authority regarding all aspects related to manpower, equipment and production.

.4 Supervisory personnel must hold a recognized certificate proving attendance at an asbestos removal training course (2-day minimum duration) and have performed supervisory functions on at least five (5) other asbestos abatement projects of similar size and complexity.

.5 At all times during work, the Overall or Shift Superintendent(s) must be on site. Failure to comply with this requirement will result in a stoppage of all work, at no cost to the Owner.

.6 Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Owner. Owner reserves the right to request replacement of supervisory personnel without explanation.

.7 Do not replace supervisory personnel without written approval from the Owner.

1.9 Instruction and Training

.1 Instruction and training must be provided by a competent person.

.2 All workers completing Type 1, 2 or 3 asbestos abatement must be trained in compliance with Section 19 of O.Reg. 278/05.

.1 For Type 3 asbestos abatement, workers must be trained and certified per Section 20 of O.Reg. 278/05.

1.10 Notification

.1 Before commencing work, notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site, where required.

.2 Inform all trades on site of the presence and location of hazardous materials identified in the Contract documents.

.3 Notify the Owner or Owner's Representative, the Joint Occupational Health and Safety Committee and the Provincial Ministry of Labour, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

.4 Notify Sanitary Landfill site as per O.Reg. 347/90 as amended.

1.11 Submittals

.1 Submit prior to starting work:

.1 Provincial Workers' Compensation Board Clearance Certificate.

.2 Insurance certificates.

.3 Copy of Company Health and Safety Policy and applicable programs.

.4 Ministry of Labour Notice of Project form.

.5 Copy of Certificate of Approval for disposal of hazardous materials waste and location of landfill.

.6 Pre-removal damage survey of the Abatement Work Area(s), waste transport routes, and bin storage areas

.2 Submit the following information regarding personnel prior to starting work:

.1 Resumes of the supervisory personnel.

.2 Proof in the form of a certificate that supervisory personnel have been certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.3 Proof in the form of a certificate that workers have been certified under the Ministry of Training, Colleges and Universities course 253W.

.4 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.5 Written statement that personnel have had instruction on hazards of exposure to hazardous materials identified within this scope, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.

.6 WHMIS training certificates for all personnel.

.7 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.

.8 Proof of training for the following site-specific hazards or conditions identified:

.1 Working at Heights
.2 Elevated Work Platform.

.3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:

.1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

.2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed if the unit is vented indoors.

.3 DOP tests to be performed by an independent testing company.

.1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).

.2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.

.3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.

.4 Proof of calibration of DOP testing equipment.

.4 Submit the following prior to isolating the work area:

.1 Safety Data Sheets for chemicals or material used in the course of the Abatement Project.

.5 Submit the following upon completion of the work.

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.12 Insurance

.1 Maintain a Commercial General Liability Policy with an insurance company acceptable to Pinchin Ltd. and London Public Library. The intent of this policy is to hold the Owner and the Construction Manager harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.

.2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to Pinchin Ltd. and London Public Library. The intent of these policies is to hold Pinchin Ltd. and London Public Library harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

.3 Maintain a Pollution Liability Policy (or asbestos/lead liability policy or specific coverage under the CGL for asbestos/lead abatement) with an insurance company acceptable to Pinchin Ltd. and London Public Library. The intent of this policy is to hold Pinchin Ltd. and London Public Library harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations.

.4 Forward all certificates to Pinchin Ltd. and London Public Library before work is commenced, showing Pinchin Ltd. and London Public Library as additional insured as their interest may appear.

.5 Pinchin Ltd. and London Public Library may request a certified true copy of the policies.

.6 The limits will not be less than:

.1 Commercial General Liability $5,000,000.00

.2	Automobile	$2,000,000.00
.3	Pollution Policy	$5,000,000.00

1.13 Inspection

.1 From commencement of work until completion of clean-up operations, the Abatement Consultant is empowered by the Owner to inspect for compliance with the requirements of governing authorities, adherence to specified procedures and materials, and to inspect for final cleanliness and completion.

.2 The Abatement Consultant is empowered by the Owner to order a shutdown of work when leakage of asbestos from the controlled work area has occurred or is likely to occur.

.3 Any deviation from the requirements of the Specifications or governing authorities that is not approved in writing may result in a stoppage of work, at no cost to the Owner.

.4 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.

.5 Inspection and air monitoring performed as a result of Contractor's failure to perform satisfactorily regarding quality, safety, or schedule, shall be back-charged to the Contractor.

.6 Facilitate inspection and provide access as necessary. Make good work disturbed by inspection and testing at no cost to the Owner.

.7 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.8 Provide 24 hours written notice to the Abatement Consultant of any request for scheduling of milestone inspections or transportation of waste through Occupied Areas.

.9 The following Milestone Inspections may take place, at the Owner's cost, as outlined in each related specification section:

.1 Milestone Inspection - Clean Site Preparation

.1 Inspection of preparations and set-up prior to contaminated work in the Abatement Work Area.

.2 Milestone Inspection – Bulk Removal Inspection

.1 Inspection during asbestos removal, monitoring removal methods, site deficiencies, performing occupied air monitoring, etc.

.3 Milestone Inspection - Visual Clearance

.1 Inspection of Abatement Work Area after completion of all abatement, but prior to application of lock-down agents or dismantling of enclosure.

.4 Milestone Inspection – Clearance Sampling

.1 Air monitoring performed following removal of asbestos and application of slow drying sealer to ensure fibre levels inside the Type 3 enclosure(s) are within the acceptable limits. The number of samples to be collected and analysed are based on the requirements of O.Reg. 278/05.

.10 Refer to the Sections identified in Related Work for specified milestone inspections which are to take place at defined points throughout the abatement operation specific to each phase or work area.

.11 Do not proceed with next phase of work until written approval of each milestone is received from the Abatement Consultant.

1.14 Air Monitoring - Asbestos

.1 Air monitoring will be performed using Phase Contrast Microscopy (PCM) following the National Institute for Occupational Safety and Health Method 7400.

.2 Co-operate in the collection of air samples.

.3 Results of PCM samples at or exceeding 0.05 fibres per cubic centimeter of air (fibre/cc) or greater, outside an Abatement Work Area, will indicate asbestos contamination of these areas. Respond as follows:

.4 Suspend work within the adjoining Abatement Work Area until written authorization to resume work has been received from the Abatement Consultant.

.5 Isolate and clean area in the same manner applicable to the Abatement Work Area.

.6 Maintain work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

.7 At the discretion of the Abatement Consultant provide additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas.

.8 Results of PCM samples at or greater than 0.01 fibres per cubic centimeter of air (fibre/cc), collected within the Abatement Work Area enclosure after the site has passed a visual inspection, and an acceptable coat of lock-down agent has been applied, will indicate asbestos contamination of these areas. Respond as follows:

.1 Maintain work area isolation and re-clean entire work area. Then apply another acceptable coat of lock-down agent to exposed surfaces throughout the work area.

.2 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified

.3 Alternate to items above, the Asbestos Abatement Contractor can pay for analysis of PCM samples by Transmission Electron Microscopy (TEM) at NVLAP accredited laboratory.

.1 Enclosure to remain sealed, with negative pressure maintained, and subject to required daily inspections until TEM results are received.

.9 Additional labour or materials expended by the Contractor to rectify unsatisfactory conditions and to provide performance to the level specified shall be at no additional cost to the Owner.

.10 Cost of additional inspection and sampling performed as a result of elevated fibre levels in areas outside the Abatement Work Area or from within the work area following completion of work, will be back charged to the Contractor.

1.15 Worker Protection

.1 Instruct workers before allowing entry to the Abatement Work Area. Instruction shall include training in use of respirators, dress, showering, entry and exiting from an Abatement Work Area, and all other aspects of work procedures and protective measures.

.2 Workers shall not eat, drink, chew gum or tobacco, vape or smoke in the Abatement Work Area.

.3 Workers shall be fully protected at all times when possibility of disturbance of hazardous materials exists.

.4 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Abatement Work Area.

.5 Respiratory Protection

.1 Refer to each particular Section of the Specification for specified type of respiratory equipment specific to each phase or work area.

.2 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
.2 Fitted so that there is an effective seal between the respirator and the worker’s face. Ensure that no person required to enter an Abatement Work Area has facial hair which affects the seal between respirator and face.
.3 Assigned to a worker for their exclusive use.
.4 Maintained in accordance with manufacturer’s specifications.
.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.
.6 Repaired or have damaged or deteriorated parts replaced.
.7 Stored in a clean and sanitary location.
.8 Provided with new filters as necessary, according to manufacturer's instructions.
.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing.
.10 Instruction on proper use of respirators must be provided by a competent person as defined by the Occupational Health and Safety Act.

.3 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres or lead/silica dust.

.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.

.3 Once coveralls are worn, treat and dispose of as contaminated waste.

.4 Is replaced or repaired if torn or ripped.

.4 Use hard hats, safety footwear and other protective equipment and apparel required by applicable construction safety regulations.

1.16 Visitor Protection

.1 Provide clean protective clothing and equipment to Authorized Visitors.

.2 Instruct Authorized Visitors in the use of protective clothing and Abatement Work Area entry and exit procedures.

.3 Authorized visitors are required to be fit tested on respirators, prior to entering Abatement Work Area.

.1 Respirator worn must be compliant with Section 13 and Table 2 of O.Reg. 278/05.

1.17 Signage

.1 Asbestos Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:

.1 There is an asbestos dust hazard.

.2 Access to the work area is restricted to persons wearing protective clothing and equipment.

.2 Lead Abatement Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:

.1 There is a lead dust, fume or mist hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.3 Silica Warning Signs: Post signs at access points to the Abatement Work Area, stating at minimum, the following:

.1 There is a silica dust hazard.

.2 Access to the work area is restricted to authorized persons.

.3 Respirators must be worn in the work area.

.4 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word "CAUTION" in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES

.2 Avoid Creating Dust and Spillage

.3 Asbestos May be Harmful to Your Health

.4 Wear Approved Protective Equipment.

.5 Place placards in accordance with Transportation of Dangerous Goods Act.

1.18 Differential Pressure Monitoring

.1 Provide and install differential pressure monitors as specified in each section.

.2 Replace damaged or non-functional equipment at the request of the Abatement Consultant.

.3 Record at minimum twice daily, and when damage to the enclosure is identified and repaired, the following information:

.1 Name of inspector.
.2 Date and time.
.3 Pressure reading.
.4 Repairs completed, if applicable.

.4 Maintain specified differential pressure.

.5 Stop contaminated work and take corrective action if pressure differential drops below the specified level. Notify the Abatement Consultant immediately.

1.19 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins for hazardous materials must be covered and locked when waste transfer is not being performed.

.3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as appropriate waste.

.4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Abatement Work Area. Recycle metals.

.5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste. Obtain prior written approval from the Abatement Consultant for each individual type of material.

.6 Clean and wash equipment prior to removal from Abatement Work Area if removed prior to completion.

.7 Place all equipment, tools and unused materials that cannot be cleaned in Abatement Waste Containers.

.8 As work progresses, and at regular intervals, transport the sealed and labelled waste containers from the Abatement Work Area to waste bin.

.9 Place items in bins according to waste classification. Place asbestos waste, lead waste, metals, non-asbestos waste, etc. in separate bins.

.10 Removal of waste containers and decontaminated tools and materials from the Abatement Work Area shall be performed as follows:

.1 Remove any visible contamination from the surface of non-porous or cleanable waste being removed from the Abatement Work Area. If the item can be cleaned, remove it from the site as clean waste.

.2 Place waste or item in Waste Container and seal closed.

.3 Wet wipe outside of Waste Container.

.4 Within Decontamination Facility, Transfer Room or at the perimeter of the Abatement Work Area, place in second Waste Container. Seal closed.

.5 Remove waste containers and transport to appropriate bin.

.11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with Owner. Use a closed, covered cart to transport through Occupied Areas.

.12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled material in the case of a rupture of a Waste Container.

.13 Pick-up and drop off of garbage bin shall be at pre-approved times and must not interfere with the Owners operations.

.14 Transport hazardous waste to landfill or waste transfer station licensed by the provincial Ministry of the Environment.

.15 Cooperate with the provincial Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the Owner.

1.20 Re-establishment of Objects and Systems

.1 Re-establish objects and items relocated by the Contractor's workforce to facilitate work.

.2 Re-establish electrical, communication, HVAC and other services previously disconnected or otherwise isolated to accommodate work by this Section.

.3 Make good at completion of work, all damage not identified in pre-removal survey.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 Refer to the Sections identified in Related Work for specified materials, equipment or facilities specific to each phase or work area.

.2 Materials and equipment must be in good condition and free of debris and fibrous materials. Disposable items must be of new materials only.

.3 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.4 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of materials.

.5 Asbestos Waste Container: A container acceptable to disposal site, Ministry of the Environment, and Ministry of Labour, comprised of the following:

.1 Dust tight.

.2 Suitable for the type of waste.

.3 Impervious to asbestos.

.4 Identified as asbestos waste.

.6 Differential Pressure Monitor: a high precision instrument for measuring and controlling pressure differences in the low range, between the Abatement Work Area and Occupied Area. Calibrate regularly to manufacturer's instructions.

.7 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter to equal negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.

.8 Ground Fault Panel: Electrical panel as follows:

.1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.

.2 Interrupters to have a 5 mA ground fault protection.

.3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.

.4 Openings sealed to prevent moisture or dust penetration.

.5 Inspected by the Electrical Safety Authority.

.6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.

.7 Provide one Ground Fault Panel for each 5,000 square feet (500 square metres) of Abatement Work Area.

.9 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Abatement Work Area and discharges the air to the exterior of the building. Equipped as follows:

.1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.

.2 Pressure differential gauge to monitor filter loading.

.3 Auto shut off and warning system for HEPA filter failure.

.4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.

.10 HEPA Vacuum: Vacuum with necessary fittings, tools and attachments. Discharged air must pass through a HEPA filter.

.11 Hose: Leak-proof, minimum busting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.

.12 Lead Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment, that is:

.1 Dust tight.

.2 Suitable for the type of waste.

.3 Evaluated for leachable lead content and disposed of in accordance with applicable regulations.

.1 Where lead waste exceeds 5.0 mg/L of lead in the TCLP analysis, label as lead waste and dispose of as leachate toxic hazardous waste.

.2 Where lead waste is below 5.0 mg/L of lead in the TCLP analysis, disposed of as construction waste.

.13 OSB: Oriented Strand Board.

.14 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints.

.15 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.

.16 Protective Clothing: Disposable coveralls complete with head covering and full body covering that fits snugly at the ankles, wrists and neck.

.17 Rip-Proof Polyethylene Sheeting: 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and two (2) layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps.

.18 Shower Hose: Water lines for supply of hot & cold water to shower facilities to be rated for use at 200 PSI (1380 kPa) or twice the working pressure whichever is greater. Supply lines to be continuous and free of fittings, joints or couplings.

.19 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.20 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.21 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

PART 3 EXECUTION

.1 Refer to the Sections identified in Related Work for specified procedures for work area preparation, maintenance, site dismantlement, application of lock-down agent and all other procedures for the safe handling, removal and clean-up of hazardous materials specific to each phase or work area.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 1 procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.

.2 When requested by personnel, provide protective clothing.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area.

.3 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation

.1 Remove stored or non-fixed items from the Abatement Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by Owner.

.2 Install one layer of rip-proofing polyethylene sheeting on walls, floors, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Abatement Work Area.

.3 Install polyethylene drop sheets below areas of work.

.4 Install polyethylene sheeting on openings in walls and floors (as required) and seal.

.5 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.6 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.7 Provide power from ground fault interrupt circuits.

.8 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.9 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.10 Without disturbing asbestos-containing materials, remove and dispose of non-hazardous materials as clean waste prior to asbestos removal work, where possible.

3.2 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Maintain Abatement Work Area in tidy condition.

.4 Remove any standing water on polyethylene/floor at the end of every shift.

.5 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Asbestos Removal - General

.1 Do not use powered tools or non-hand held tools.

.2 Do not use compressed air to clean or remove dust or debris.

.3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.

.4 Wet ACM prior to work and keep ACM wet throughout the removal process.

.5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.6 Frequently and at regular intervals, place all waste in asbestos waste containers.

.7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Drywall with Asbestos Drywall Joint Compound (less than 1 square metre)

.1 Protect drywall around area to be removed by covering with polyethylene and taping seams to wall.

.2 Mist surface of drywall and drywall joint compound.

.3 Cut drywall and remove using non-powered hand-held tools. Place directly into a 6 mil polyethylene bag.

.4 HEPA vacuum floor and Abatement Work Area.

3.5 Abatement Work Area Dismantling

.1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.

.2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.

.3 Clean polyethylene sheeting and drop sheets with HEPA vacuum or wet cleaning methods at completion of work.

.4 Wet drop sheets and polyethylene sheeting.

.5 Carefully roll polyethylene sheeting and drop sheets toward the centre. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.

.6 Remove remaining polyethylene sheeting and tape.

.7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.6 Waste and Material Handling

.1 Refer to Section 02 81 00.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 2 procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following minimum respiratory protection to all personnel:

.1 Full face respirators with P100 high efficiency (HEPA) cartridge filters, for:

.1 Use of a HEPA filtered power tool on non-friable ACM if the material is not wetted.

.2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

.2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

.3 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

.1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set.

.1 Provide a lock box with key to the door.

.2 Provide lock box code to Abatement Consultant and Owner.

.2 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.

.3 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.4 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.5 Install one layer rip-proof polyethylene sheeting over roof.

.6 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.7 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.2 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.4 Provide power from ground fault interrupt circuits.

.5 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.6 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

3.2 Site Preparation – Enclosure Required

.1 Install polyethylene enclosure complete with Windows at Abatement Work Areas for the following work:

.1 Removal of friable asbestos-containing texture finish (less than 1 square metre)

.2 Removal of non-friable asbestos-containing drywall (greater than 1 square metre)

.2 Install Transfer Room where duration of work is to last longer than one 8-hour shift.

.3 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.4 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.

.1 Minimum requirement over carpet is one layer of 6 mil polyethylene under one layer of rip-proof polyethylene.

.2 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.

.5 Construct Type B Hoarding Walls between Abatement Work Area perimeter and occupied areas.

.6 Install polyethylene sheeting at openings in walls (as required) and seal.

.7 Install 6 mil polyethylene sheeting on walls within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.8 Install Curtained Doorways.

.9 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Bulkheads.

.4 Plumbing fixtures.

.5 Electrical Equipment.

.6 Mechanical Equipment.

.10 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.11 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Arrange negative air units to maximize the distance between units and decontamination facilities.

.4 Provide weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.

.5 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.

.6 Replace prefilters to maintain specified flow rate.

.7 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.8 Discharge HEPA filtered negative air machines as follows:

.1 To building exterior.

.1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.

.2 Install panel securely in window frame so that it cannot be pushed into the building and make weather-tight with caulking.

.3 For each negative pressure unit, provide a 300 mm diameter, screened, duct opening through panel.

.4 Direct discharge away from building access points.

.5 Reinstall glazing to match existing upon completion of work.

.12 Place required tools to complete the abatement with the Abatement Work Area.

.13 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

3.3 Site Preparation – No Enclosure Required

.1 Install caution tape around work area where existing walls are not present.

.2 Cover walls, floors, finishes, millwork, equipment and furnishings remaining in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.

.3 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Bulkheads.

.4 Plumbing fixtures.

.5 Electrical Equipment.

.6 Mechanical Equipment.

.4 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.5 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.6 Place HEPA vacuum in Abatement Work Area.

.7 Place required tools to complete the abatement with the Abatement Work Area.

3.4 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.4 Maintain Abatement Work Area in tidy condition.

.5 Remove standing water on polyethylene/floor at the end of every shift.

.6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Asbestos Removal - General

.1 Do not use compressed air to clean or remove dust or debris.

.2 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.3 Frequently and at regular intervals, place all waste in asbestos waste containers.

.4 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.6 Asbestos Removal – Texture Finish (less than 1 Square Metre)

.1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation – Enclosure Required*.

.2 Protect texture around area to be removed by covering with polyethylene and taping seams to wall.

.3 Cut texture and remove using non-powered hand-held tools. Place directly into polyethylene waste bag, or sealed container until at waste bin.

.4 Remove studs, lath, or substrate where specified. Clean studs, lath, substrate and remove from Abatement Work Area.

.5 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.7 Asbestos Removal - Drywall with Asbestos Drywall Joint Compound (greater than 1 square metre)

.1 Use the procedures described above under *Site Preparation – Enclosure Required*.

.2 Protect drywall around area to be removed by covering with polyethylene and taping seams to wall.

.3 Cut drywall and remove using non-powered hand-held tools. Place directly into polyethylene waste bag, or sealed container until at waste bin.

.4 Remove all screws and fasteners in studs or strapping.

.5 Remove studs and strapping where specified. Clean metal studs and remove from Abatement Work Area.

.6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.8 Asbestos Removal - Other Non-Friable Asbestos Materials with HEPA Filtered Power Tools

.1 Use the procedures described above under *Site Preparation – No Enclosure Required*.

.2 Wet all material to be disturbed.

.3 Turn on HEPA vacuum. Vacuum to remain operation throughout work.

.4 Place removed ACM directly into an asbestos waste container.

.5 IF power tool can disconnect from HEPA vacuum, remove tool, and HEPA vacuum tool and bit, blade, etc., and shrouds.

.6 Wet clean or HEPA vacuum the entire Abatement Work Area, including surfaces not covered with polyethylene sheeting. Any materials or equipment removed to access ACM that are to be reused, must be wet cleaned or vacuumed prior to reinstatement.

3.9 Application of Post Removal Sealant

.1 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.

.2 Do not apply post removal sealant to materials that will be damaged by its application.

3.10 Abatement Work Area Dismantling

.1 Wash or HEPA vacuum equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.

.2 Place tools and equipment used in contaminated work site but not cleaned in polyethylene bags prior to removal from Abatement Work Area.

.3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.

.4 Wet drop sheets and polyethylene sheeting.

.5 Carefully roll polyethylene sheeting and drop sheets toward the centre of enclosure. As polyethylene is rolled away, immediately remove visible debris beneath with a HEPA vacuum.

.6 Remove remaining polyethylene sheeting and tape, and dispose of as asbestos waste.

.7 Place polyethylene sheeting, drop sheets, tape, disposal clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

.8 Remove remaining site isolation, seals, tape, etc.

.9 Remove Transfer Room.

.10 Remove seals, tape, Signage etc.

.11 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.

.12 Seal openings in HEPA vacuums.

.13 Remove and dispose of the pre-filters from HEPA filtered negative pressure machines as asbestos waste.

.14 Remove HEPA filtered negative pressure machines and discharge ducting or HEPA vacuums.

.15 Remove temporary lights.

.16 Remove ground fault panels.

.17 Place contaminated materials including polyethylene sheeting, drop sheets, seals, tape, disposable coveralls, and other contaminated waste in asbestos waste containers.

3.11 Waste and Material Handling

.1 Refer to Section 02 81 00.

3.12 Re-Establishment of Items

.1 Upon completion of work:

.1 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.

.2 Remove hose bibs installed and repair pipe.

.3 Remove negative air discharge panel and reinstall glazing to match existing.

.4 Reinstall ducts removed to perform cleaning of ducts or to access ACM.

.5 Clean, mop and vacuum Abatement Work Area and area beneath Decontamination Facilities.

.6 Enable building air handling systems.

.2 Notify Abatement Consultant to the need for Milestone Inspection – Re-establishment Inspection.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 Install Hoarding Walls between Abatement Work Area and Occupied Area.

.3 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of asbestos-containing materials following Type 3 procedures, and Pinchin and Owner specific requirements.

1.3 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following respiratory protection to all personnel:

.1 Full Face Air Purifying Respirators with P100 high efficiency (HEPA) cartridge filters during projects when performing wet abatement of sprayed applied surfacing materials containing chrysotile asbestos, or wet abatement of other non-surfacing asbestos-containing material specified in this section.

.2 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters for:

.1 Removing visible dust and friable material from surfaces in the work area prior to construction of enclosure.

.2 Dismantling of Type 3 enclosures, using Type 2 Procedures.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.4 Differential Pressure Monitoring

.1 Install differential pressure monitor at a location chosen by the Abatement Consultant.

.2 Co-operate with the Abatement Consultant in collection of pressure monitoring data.

.3 Maintain specified differential pressure at monitoring location. Negative air pressure is to be -0.02 inches of water, relative to the area outside the enclosed area.

1.5 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection - Visual Clearance

.3 Milestone Inspection – Clearance Sampling

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

.2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

.3 Type C Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of plywood, OSB, or gypsum board with one coat of primer and one coat of flat white latex.

.4 Type D Hoarding Wall: 1 Hour rated partition to ULC Design W407. Floor to deck, 38 mm x 89 mm metal studs at 400 mm o/c with continuous sill and top plate, complete with mineral wool batts in cavity, covered with 16 mm Type X gypsum wall board both sides, taped and mudded joints, with acoustic sealant at top and bottom of plates, both sides. Install 2 layers of 6 mil polyethylene sheeting on Abatement Work Area side. Paint Occupied Area side of board with one coat of primer and one coat of flat white latex.

.5 Type E Hoarding Wall: Construct as per Type C using exterior grade plywood and insulate wall cavity with R 12 fibreglass batts insulation.

.6 Type F Hoarding Wall: Upper perimeter hoarding wall - 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with 2 layers of polyethylene sheeting on Abatement Work Area side. Anchor wall to underside of structure and extend down to top of ceiling or top of wall/hoarding wall below. Install wall under contaminated conditions.

.7 Windows: Install sufficient transparent windows in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Decontamination Facilities

.1 Workers' Decontamination Facility: A decontamination facility comprised of three linked rooms, Contaminated Change Room, a Shower Room, and a Clean Change Room.

.1 Rooms, Occupied Areas and Abatement Work Areas, shall be separated by curtained doorways at each door.

.2 Contaminated Change Room: Room between Shower Room and Abatement Work Area.

.1 Locate on contaminated side of Shower Room.

.2 Install asbestos waste container for asbestos contaminated protective clothing.

.3 Install storage facilities for any personal protective equipment to be reused in Abatement Work Area including boots, hard hats, etc., but excluding respirators.

.4 Install hooks and shelves as required for personal protective equipment.

.5 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

.3 Shower Room: Room between Clean Change Room and Contaminated Change Room.

.1 Install one walk through shower unit for every six workers.

.2 Install constant supply of hot and cold water, controllable at each shower. Water supply must be sufficient to provide water at a minimum temperature of 40 degrees Celsius (maximum 50 degrees) in a volume required for all workers to properly decontaminate.

.1 Install individual hot and cold shut-off valves on water supply located on clean side of Shower Room. Connect shower to these valves.

.2 Install individual controls inside the shower to regulate water flow and temperature.

.3 Install rigid piping or Shower Hose with watertight connections for supply and drains.

.4 Install a sealed drip pan under and around the showers, 150 mm deep.

.5 Install sump pumps, sufficient for volume of waste shower water from showers and drip pan. Direct waste shower water to sanitary drains.

.6 Install ground fault protected power switch on clean side of shower for sump pumps, or timed for shut off.

.7 Provide adequate quantity of soap, shampoo, clean towels

.8 Install an Asbestos Waste Container for disposal of used respirator filters, on the contaminated side of the Shower Room.

.4 Clean Change Room: A room between the Shower Room and Occupied Areas.

.1 Install hooks and shelves on clean side of shower in clean Change Room for storage of respirators.

.2 Install lockers or hangers for workers' street clothes and personal belongings.

.3 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.

.4 Install hose bib on domestic cold-water pipe for connection on clean side of Abatement Work Area.

.5 Install electric hot water tank for showers in decontamination facility.

.6 Provide ground fault protected power supply to hot water tanks, sump pump, battery chargers.

.7 Install a fire extinguisher, mount to wall.

.8 Minimum size of generally 2m x 2m. Increase size accordingly to accommodate number of workers.

.5 Waste and Equipment Decontamination Facility: Waste and Equipment Decontamination Facility comprised of three linked rooms: a Container Cleaning Room, a Holding Room and a Transfer Room.

.1 Purpose of Waste and Equipment Decontamination Facility is to provide a means to decontaminate asbestos waste containers, scaffolding, vacuums, and other tools and equipment and materials required in the Abatement Work Area.

.2 Rooms, Occupied Areas and Abatement Work Areas, shall be separated by curtained doorways at each door.

.6 Container Cleaning Room: Room between Abatement Work Area and Holding Room of sufficient size to allow proper washing of equipment and waste containers or double bagging of asbestos waste. All wash water shall be treated as asbestos contaminated waste.

.7 Holding Room: Room between Container Cleaning Room and Transfer Room, of sufficient size to accommodate at least two asbestos waste containers and two workers double bagging waste, or for largest item of equipment used.

.1 Install a fire extinguisher mounted to wall.

.8 Transfer Room: Room between Holding Room and Occupied Area, acting as an air lock for the transfer of waste.

.1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.

.9 Construction of Decontamination Facilities

.1 Install floor protection as follows:

.1 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire decontamination facility.

.2 Turn 600 mm of polyethylene up the sides of the decontamination facility and overlap with the polyethylene sheeting covering the walls.

.3 Install plywood with taped and caulked joints between layers of 6 mil polyethylene where required to protect surfaces from water damage (e.g. carpet).

.2 Install walls as follows:

.1 Around all rooms, between all rooms, at entrance to Abatement Work Area and at entrance to Occupied Area.

.2 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.3 Install one layer rip-proof polyethylene sheeting on interior walls of Decontamination Facility.

.4 Install one layer rip-proof polyethylene sheeting both sides on interior dividing walls of Decontamination Facility.

.5 For perimeter walls exposed to the Abatement Work Area, install 13 mm plywood or OSB caulked and sealed at joints, beneath one layer of 6 mil and one layer of rip-proof polyethylene sheeting, on Abatement Work Area side of framing.

.6 For perimeter walls exposed to the Occupied Area, install 13 mm plywood or OSB caulked and sealed at joints, over polyethylene sheeting, on Occupied Area side of framing. Paint with 2 coats white latex.

.3 Install roof as follows:

.1 Install joists. Size of joists is to be determined by clear span. Consult Provincial Building Code. For clear spans up to 2850 mm use SPF Select 38 x 140 mm wood joist at 400 mm o/c with continuous 38 x 140 mm wood headers, and install strapping beneath joists.

.2 At the Contaminated Change Room and where roof is exposed to the Abatement Work Area, install 19 mm plywood or OSB over joists. Caulk and tape joints and install one layer rip-proof polyethylene sheeting over 2 layers of 6 mil polyethylene sheeting.

.3 Where roof is not exposed to the Abatement Work Area, install one layer rip-proof polyethylene sheeting over joists.

.4 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.5 At underside of joists in all rooms, install one layer of polyethylene sheeting.

.6 Minimum interior clear height 2000 mm to underside of joist.

.10 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors between chambers, facilities and Abatement Work Area.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Clean Site Preparation

.1 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.2 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Type 2 Procedures.

.3 Install Hoarding Walls between Abatement Work Area and Occupied Area.

.4 Install Decontamination facilities.

.1 Worker Decontamination Facility to be located within the Abatement Work Area.

.2 Waste Decontamination Facility to be located within the Abatement Work Area.

.5 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged. Items to remain include but are not limited to:

.1 Millwork.

.2 Doors.

.3 Bulkheads.

.4 Plumbing fixtures.

.5 Electrical Equipment.

.6 Mechanical Equipment.

.6 Seal openings (excepting electrical trenches) in floor using tape, polyethylene, etc. Openings in floor are to be sealed independently prior to installation of polyethylene sheeting on floor.

.7 Seal openings in walls below ceiling level using polyethylene, tape, etc. including but not limited to windows, doors, vents, diffusers, etc.

.8 Seal openings in ceiling, using polyethylene, tape, etc. including diffusers, grills, etc.

.9 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting, on floor surfaces in Abatement Work Area.

.1 Extend floor protection a minimum of 300 mm up all vertical surfaces in the Abatement Work Area.

.10 On walls within and forming the perimeter of the Abatement Work Area install two layers of 6 mil polyethylene sheeting.

.1 At junction of floor and wall surface overlap floor polyethylene with wall polyethylene by a minimum of 300 mm at each layer. One layer of wall polyethylene must always overlap the top layer of floor polyethylene.

.11 Establish negative pressure in Abatement Work Areas as follows:

.1 Discharge HEPA filtered negative pressure machines as follows:

.1 To building exterior.

.1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.

.2 Install panel securely on the exterior side of the window frame and make weather-tight with caulking.

.3 For each negative pressure unit, provide a 300 mm diameter, duct opening through panel.

.4 Cover duct opening with wire screen and/or chicken wire or extruded metal screen to prevent insect and animal entry.

.5 Direct discharge away from building access points.

.6 Store glazing for reinstallation upon completion of work.

.12 Install Ground Fault Panel.

.13 Install temporary lighting in all work areas at levels that will provide for a safe and efficient use of the work area.

.14 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.15 Install hose bib on domestic cold-water pipe for connection of hoses for wetting.

.1 Install hoses with watertight connections and airless sprayers to wet asbestos-containing materials.

.16 Shut down HVAC systems serving the Abatement Work Area.

.1 Leave induction units at building exterior walls on lowest supply setting when temperatures are below 0°C so windows and exterior walls do not ice.

.2 Disable any exhaust/return systems at induction units, washrooms, etc.

.3 Seal and protect induction units with one layer of 6 mil polyethylene sheeting.

.17 Notify Abatement consultant Milestone Inspection - Clean Site Preparation. Obtain written approval for this Milestone Inspection before proceeding.

.18 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.19 Post Ministry of Labour Notice of Project.

.20 Using Type 2 (Moderate Risk) Procedures remove and dispose of partitions constructed of drywall and asbestos-containing drywall joint compound (including framing) that are specified to be removed. Remove partitions extending to underside of ceiling only.

3.2 Maintenance of Contaminated Abatement Work Area

.1 Inspect Abatement Work Area at the beginning and end of each working period and once on each day work does not take place. Inspection must be performed by competent person.

.2 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.3 Perform Differential Pressure Monitoring on a frequent basis and record pressure at start and end of shift at a minimum.

.4 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.5 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.6 Maintain Abatement Work Area in tidy condition.

.7 Remove waste and debris frequently.

.8 Remove standing water on polyethylene/floor at the end of every shift.

.9 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

.10 Turn off water supply to showers, at the end of every shift.

.11 Ensure shower pans are pumped out at the end of every use and shift.

3.3 Wet Removal

.1 Do not use compressed air to clean or remove dust or debris.

.2 Spray asbestos-containing sprayed material with Amended Water using airless spray equipment prior to removal. Saturate ACM to prevent release of airborne fibres during removal.

.3 Remove asbestos-containing sprayed material specified to be removed, clean substrate.

.1 Fully saturated ACM may be scraped directly into waste containers or may be allowed to fall to floor.

.2 ACM cannot be allowed to fall from one level to the next.

.4 Remove obstructions as required to remove the ACM.

.1 Notify Abatement Consultant if item is not specified to be removed and inhibits removal of ACM.

.2 Do not demolish any existing walls etc. that form the perimeter of the Abatement Work Area without prior written permission from Abatement Consultant.

.5 All dislodged ACM shall be maintained in wet state until placed in asbestos waste containers for disposal.

.6 As work progresses, and at regular intervals, place waste in asbestos waste containers and remove from the Abatement Work Area.

.7 After completion of gross asbestos removal work, perform the following:

.1 Wet clean surfaces from which ACM has been removed with stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

.2 Wet clean surfaces which ACM has fallen on using stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

.3 Wet clean other surfaces in the Abatement Work Area, including the decontamination facilities, scaffolding, equipment, polyethylene sheeting on floor and walls surfaces etc., ducts and similar items not covered with polyethylene sheeting.

.4 Remove wash water as contaminated waste.

.5 Remove waste.

.6 Level of cleanliness must be acceptable to Abatement Consultant.

.7 Remove and dispose of the pre-filters from all negative air units as asbestos-contaminated waste.

.8 Notify Abatement Consultant to the need for Milestone Inspection - Visual Clearance.

3.4 Waste and Material Handling

.1 Refer to Section 02 81 00.

3.5 Application Of Post Removal Sealant

.1 Wet Removal

.1 Obtain Abatement Consultant's written permission to proceed.

.2 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer’s Instructions, to cover all surfaces on all items in the Abatement Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition.

.1 Do not apply post removal sealant to materials that will be damaged by its application.

.3 Notify Abatement Consultant to the need for Milestone Inspection – Clearance Sampling.

3.6 Air Clearance Monitoring

.1 Site must be dry prior to Air Clearance Monitoring.

.2 The number of Air Clearance Monitoring samples will be as follows:

.1 2 samples for less than 10 square metres.

.2 3 samples for 10 to 500 square metres.

.3 5 samples for more than 500 square metres.

.3 Prior to air clearance monitoring, install clean 20-inch fans for air circulation during Air Clearance Monitoring.

.1 At least one fan per 10,000 cubic feet of space in Abatement Work Area.

.2 Install in centre of Abatement Work Area and space evenly.

.3 The fan exhaust shall be directed upwards or toward the ceiling.

.4 The fans shall be operated on the lowest speed setting.

.4 Restrict access to Abatement Work Area and operate negative air units for a 12 hour period prior to Milestone Inspection – Clearance Sampling.

.5 The HEPA filtered negative pressure machines shall be in operation during clearance air monitoring.

.6 In the presence of the Abatement Consultant, immediately prior to air clearance monitoring, use a leaf blower to dislodge loose fibre.

.1 Direct leaf blower against walls, ceilings, floors, and other surfaces.

.2 Perform this for at least five minutes per 1,000 sq. ft. of Abatement Work Area.

.7 PCM samples will be collected as per Air Monitoring Section.

3.7 Abatement Work Area Dismantling

.1 Use Type 2 worker precautions during dismantling.

.2 Operate negative air units during dismantling.

.3 Polyethylene, tape, cleaning material, etc. to be treated as asbestos waste.

.4 Wash remaining equipment and tools used in contaminated Abatement Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Abatement Work Area.

.5 Clean Abatement Work Area, Equipment and Access area, washing/Showering Room.

.6 Remove upper seals, and seals over tops of walls, on deck, at columns, etc. within the Abatement Work Area.

.7 Remove top layer of polyethylene sheeting from surfaces protected by two or more layers of polyethylene sheeting. The bottom layer of polyethylene will remain until all re-fireproofing is complete. Remove outer layer as follows:

.1 Remove asbestos contaminated Polyethylene by carefully rolling away from walls to centre of Abatement Work Area.

.2 Cut the lower layer of polyethylene sheeting to expose the baseboards, window sills, cabinets, shelves and other horizontal surfaces that may be contaminated by fallen ACM.

.3 Remove visible fibres or residue found during removal of polyethylene using a HEPA vacuum.

.4 Remove polyethylene protection and hoarding walls where hoarding walls separate occupied areas from work area. Hoarding walls to remain are identified on asbestos demolition drawings.

.8 Remove top layer of polyethylene on walls, finishes, and equipment.

.9 Remove remaining polyethylene sheeting.

.10 Remove water hoses and shut off at source.

.11 Remove Signs, Hoarding Walls, Decontamination Facilities, etc.

.12 Seal vacuum hoses and fittings, flexible ductwork and all tools used in contaminated work site in 6 mil polyethylene bags prior to removal from Work Area.

.13 Remove temporary lights.

.14 Remove negative air unit prefilters. Dispose of as asbestos contaminated waste.

.15 Remove HEPA filtered negative pressure machines and discharge ducting.

.16 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.

.17 Notify Abatement Consultant to the need for Milestone Inspection - Dismantling Inspection.

3.8 Re-Establishment of Items

.1 Upon completion of work:

.1 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.

.2 Remove hose bibs installed and repair pipe.

.3 Remove negative air discharge panel and reinstall glazing to match existing.

.4 Reinstall ducts removed to perform cleaning of ducts or to access ACM.

.5 Clean, mop and vacuum Abatement Work Area and area beneath any tunnels, platform and Decontamination Facilities.

.6 Enable building air handling systems.

END OF SECTION

PART 1 GENERAL

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 1 or Low Risk procedures, and Pinchin and Owner specific requirements.

.3 Comply with requirements of this Section when performing following Work:

.1 Removal of lead-containing surface coatings with a chemical gel, stripper or paste.

.2 Removal of materials coating with lead-containing surface coatings, using non-powered hand tools, where the materials remains primarily intact, and is not crumbled, pulverized or powdered.

.3 Removal of lead-containing surface coatings with a heat gun.

.4 Removal of lead-containing surface coatings using high pressure water jet.

.5 Installation or removal of lead sheeting, flashings, packing, babbits, caulking, gaskets, batteries in emergency lighting, electrical components, solder or similar.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of lead.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide non-powered half-face respirators with P100 high efficiency cartridge filters when requested by personnel.

.2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Dust impermeable gloves appropriate for the work being completed.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.4 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.5 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.6 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.7 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.8 Do not use compressed air to clean or remove dust or debris.

.9 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.10 Frequently and at regular intervals, place all waste in waste containers.

.11 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation – No Enclosure Required

.1 Isolate Abatement Work Area with barrier tape.

.2 Protect floor surfaces covered from wall to wall with polyethylene sheets.

.3 Maintain Abatement Work Area in tidy condition.

.4 Remove waste and debris frequently.

.5 Remove standing water on polyethylene/floor at the end of every shift.

.6 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.3 Lead-Containing Paint Abatement

.1 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.2 Wetting agents should be used where possible.

.3 Wet methods are not to be used if it creates a hazard or cause damage to equipment or to project.

.2 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.

.3 Waste water from cleaning or removal operations must be contained, for treatment or disposal.

.4 Remove lead-containing paint in small sections and pack as it is being removed in sealable lead waste containers.

.5 Follow manufacturer’s instructions for all use of chemical gels, strippers and pastes.

.1 Ensure agent neutralizers, were required, are applied.

.2 Do not use chemical gels, strippers or pastes on surfaces where they are scheduled to be repainted, and the material affect the new paint application.

.6 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.7 After wire brushing and wet sponging to remove visible lead-containing paint, wet clean entire work area, and equipment used in process.

.1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.

.2 Ensure all waste is cleaned and packaged.

.8 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside.

3.4 Bulk Lead Removal

.1 Lead-containing batteries should be removed and recycled in appropriate programs.

3.5 Waste Management and Disposal

.1 Per Section 02 81 00.

3.6 Final Cleaning

.1 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

.2 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.

.3 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of lead-containing materials following Class 2 or Moderate Risk procedures, and Pinchin and Owner specific requirements.

.3 Comply with requirements of this Section when performing following Work:

.1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.

.2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.

.3 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.

.4 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of lead.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide the following respiratory protection to all personnel, at minimum:

.1 Non-powered half-face respirators with P100 high efficiency cartridge filters.

.2 Non-powered full-face respirators with P100 high efficiency cartridge filters for spray application of lead-containing surface coatings.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Dust impermeable gloves appropriate for the work being completed.

.2 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.3 Provide protective clothing, to all personnel entering the Abatement Work Area.

.4 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.5 Lead-specific soaps and hygiene indicators are recommended to be provided for shower and hand-wash stations.

1.5 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection – Bulk Removal Inspection

.3 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

.2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

.3 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

.1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.

.2 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.

.3 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.4 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.5 Install one layer rip-proof polyethylene sheeting over roof.

.6 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.7 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.2 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.3 Isolate, at panel, and disconnect existing power supply to Abatement Work Area. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Abatement Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.4 Shut down HVAC systems serving the Abatement Work Area.

.1 Install polyethylene sheeting over openings in ducts and diffusers and seal.

.2 HVAC to remaining areas of building must not be disrupted during work of this section.

.3 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.4 Perform work at scheduled times after shutting down HVAC systems affecting the Abatement Work Area.

.5 Remove visible dust from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.6 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.7 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.8 Do not use compressed air to clean or remove dust or debris.

.9 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.10 Frequently and at regular intervals, place all waste in waste containers.

.11 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.2 Site Preparation –Enclosure Required

.1 Install Transfer Room where duration of work is to last longer than one 8 hour shift.

.2 Install Curtained Doorways.

.3 Install polyethylene sheeting at openings in walls (as required) and seal.

.4 Seal openings in floor using tape, caulking, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.5 Install polyethylene sheeting on floors of Abatement Work Area. Use sufficient layers to provide adequate protection for carpeting and equipment.

.1 Cover floors first so that polyethylene on walls is overlapped by at least 305 mm.

.6 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.7 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.

.8 Place required tools to complete the abatement with the Abatement Work Area.

.9 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.10 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Operate HEPA filtered negative pressure machines continuously from first disturbance of ACM until completion of dismantling.

.4 Replace prefilters to maintain specified flow rate.

.5 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.6 Discharge HEPA filtered negative air machines to building exterior, where possible.

.1 Direct discharge away from building access points.

.11 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of lead hazard, and lead hazard where appropriate.

3.3 Site Preparation – No Enclosure Required

.1 Cover materials to remain in the Abatement Work Area with polyethylene sheeting before disturbing ACM to control the spread of dust.

.2 Install caution tape around work area where existing walls are not present.

.3 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.4 Place HEPA vacuum in Abatement Work Area.

.5 Place required tools to complete the abatement with the Abatement Work Area.

.6 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a lead dust hazard.

3.4 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.4 Maintain Abatement Work Area in tidy condition.

.5 Remove standing water on polyethylene/floor at the end of every shift.

.6 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.5 Lead Abatement

.1 Use the procedures described above under *Site Preparation – Enclosure Required*.

.1 Removal of lead-containing surface coatings or materials by scraping or sanding (including wet sanding) using non-powered hand tools.

.2 Demolition of plaster or other building components that crumble, pulverize or powder and are covered with lead-containing surface coating.

.2 Use the procedures described above under *Site Preparation – No Enclosure Required*.

.1 Removal of lead containing paint using power tools with an effective dust collection system equipped with HEPA filter.

.2 Welding, torching or high temperature cutting of lead-containing surface coatings or materials indoors, with use of an effective fume collector or smoke eater.

.3 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.4 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.1 Wetting agents should be used where possible.

.2 Wet method not be used if it creates a hazard or cause damage to equipment or to project.

.5 Provide drop sheets below all lead operations that may produce dust, chips or debris containing lead.

.6 Waste water from cleaning or removal operations must be contained, for treatment or disposal.

.7 Remove lead containing paint in small sections and pack as it is being removed in sealable waste containers.

.8 Waste generated should be maintained wet until cleaned and packaged.

.9 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.10 After wire brushing and wet sponging to remove visible lead containing paint, wet clean entire work area, and equipment used in process.

.1 Compressed air or dry sweeping not be used to clean up lead-containing dust or waste.

.2 Ensure all waste is cleaned and packaged.

.11 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.

3.6 Waste Management and Disposal

.1 Per Section 02 82 00.

3.7 Final Cleaning

.1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Clean visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.

.3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and seal. Dispose of in accordance with waste materials generated.

.4 Clean Work areas and Transfer Room, where present.

.5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.

.6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the identification, removal, preparation for disposal, transportation, and disposal of mercury-containing fluorescent lamps.

1.3 Quality Assurance

.1 Use qualified contractors to isolate mechanical/electrical services prior to the removal of lamps or other mercury-containing equipment.

.2 Ensure the removal and handling of mercury-containing equipment is performed by persons experienced in the methods, procedures and industry practices.

.3 Complete work so that at no time does mercury contaminate the building or environment.

1.4 Instruction and Training

.1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:

.1 Hazards of mercury.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that may be used during work, including training on:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section.

.2 Instruction and training must be provided by a competent, qualified person.

1.5 Personal Protection

.1 During removal of equipment containing mercury, personnel are to wear personal protective equipment appropriate to the work being performed.

.2 The following personal protection is to be available on site in the event of a spill or leak:

.1 Non-powered half-face respirators with combined P100 and mercury cartridge.

.2 Protective clothing.

.3 Rubber, nitrile or latex gloves.

PART 2 PRODUCTS

2.1 Materials

.1 Label: Mercury warning labels.

.2 Lamp Storage Container: Cardboard box that lamps were originally packaged within, or plastic or cardboard totes for recycling lamps. Intent is to package lamps so that they are not broken during shipping. Container to be designed for lamps of that size.

.3 Mercury Sponge: A plated metal-wool pad for the pick-up of mercury spills.

.4 Mercury Vacuum: Nilfisk VT Mercury Vacuum or equal. Vacuum used to collect liquid mercury and granular mercury compounds with an internal HEPA filter and an activated carbon adsorbent filter to purify exhaust air of mercury vapours.

.5 Neutralizing Agent: Mercon X or similar. Mercury neutralizing solution such as 20% calcium polysulfide or sodium thiosulphate.

.6 TSP: Tri Sodium Phosphate, or other strong cleaner

PART 3 EXECUTION

3.1 Equipment Removal

.1 Prior to removing any fixtures or equipment, ensure associated services is isolated and de-energized.

.2 Locate and remove the following materials designated to be disposed of:

.1 Fluorescent lamps

.3 Place all mercury-containing equipment into containers to prevent breakage.

.4 Provide an accurate inventory of the contents of each container including number of light tubes and lamps and an estimate of the total weight of the container in kilograms.

3.2 Packaging

.1 Do not contaminate building surfaces mercury.

.2 Notify Owner's Representative of any spills immediately.

.1 Any spills of mercury are to be cleaned to the satisfaction of the Owner's Representative at the contractor's cost. This includes removal and replacement of building materials as required.

.3 Install polyethylene drop sheets in packaging area to protect surfaces and finishes.

.4 Package lamps in lamp storage containers. Do not break lamps.

3.3 Emergency Response for Spills

.1 For small spills:

.1 Evacuate area. Only personnel using the specified personal protective equipment are to be in spill area.

.2 Open windows or provide ventilation to area.

.3 Clean mercury and broken glass with mercury vacuum.

.4 Clean horizontal surfaces impacted by spill with TSP or approved alternative cleaner.

.2 For large mercury spills:

.1 Evacuate area. Only personnel using the specified personal protective equipment are to be in spill area.

.2 Contact Owner's Representative immediately.

.3 Open windows or provide ventilation to area.

.4 Deactivate heat systems if they are adjacent and may aid in vaporization of mercury.

.5 If spill cannot be cleaned up immediately, apply neutralizing agent over mercury spill area.

.6 Collect mercury droplets together will a dust pan, squeegee or mercury vacuum.

.7 Clean-up bulk mercury using aspirator bulb or mercury vacuum. Clean remainder with a mercury sponge. Place mercury in closed container (plastic or glass).

.8 Porous surfaces are to be cleaned with Neutralizing Agent after clean-up of bulk mercury. Neutralizing Agent to be cleaned with mercury vacuum, or manufacturer's instructions.

.9 If mercury spills into soil, carpet, through cracks, into drains etc. further removal of surface materials at contractor cost will be required. Do not proceed without approval from Owner's Representative.

.10 Place all cleaning materials including drop sheets or polyethylene sheeting in containment drums.

3.4 Transportation and Reporting

.1 Transport materials following Transportation of Dangerous Goods Act.

.1 Transport Mercury Materials and Waste to approved site for recycling, including mercury vapour in lamps, and ensure materials are recycled.

.2 The facility used to process and recycle the mercury shall be approved by the Ministry of the Environment, Conservation and Parks, or local jurisdictional authority, and shall have valid Certificates of Approval to carry out the work outlined herein.

.1 The facility must issue a Certificate of Recycling identifying types and quantities of materials generated from the project. The facility must also provide a Certificate of Recycling for the mercury generated from the project.

.3 Provide the Abatement Consultant a copy of each waste manifest and or a letter from the recycling agency acknowledging receipt of the materials.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of silica-containing materials following Type 1 procedures, and Pinchin and Owner specific requirements.

.3 Comply with requirements of this Section when performing following Work:

.1 Drilling of holes in concrete or rock, excluding tunneling operations and road construction

.2 Any operation at a project that requires handling of silica-containing material in a way that may result in a worker being exposed to airborne silica, and not defined in other sections.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of silica.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide non-powered half-face respirators with P100 high efficiency cartridge filters.

.2 Provide protective clothing, when requested by personnel, entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

1.5 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.2 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.3 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.4 Do not use compressed air to clean or remove dust or debris.

.5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.6 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

.7 Remove standing water on polyethylene/floor at the end of every shift.

.8 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.2 Site Preparation – No Enclosure Required

.1 Isolate Abatement Work Area with barrier tape located a minimum of 10 metres away from work being performed.

.2 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a silica dust hazard.

.3 Maintain Abatement Work Area in tidy condition.

.4 Remove waste and debris frequently.

.5 Place required tools to complete the abatement with the Abatement Work Area.

3.3 Silica Handling

.1 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.2 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.1 Wetting agents should be used where possible.

.2 Wet methods should not be used if it creates a hazard or cause damage to equipment or to project.

.2 Power tools to be equipped with a shroud, and to be kept flush with surface.

.3 Waste generated should be maintained wet until cleaned.

END OF SECTION

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PART 1 GENERAL

1.1 General and Related Work

.1 Read this Section in conjunction with all drawings and all other Sections so as to comply with the requirements of the General Conditions of the Contract.

.2 Requirements specified elsewhere:

.1 Section 02 81 00 Hazardous Materials – General Provisions

1.2 Outline of Work

.1 Refer to Section 02 81 00 Hazardous Materials – General Provisions for the Outline of Work.

.2 The intent of this Section is to provide safe work practices and procedures to govern the handling, removal, clean-up and disposal of silica-containing materials following Type 2 procedures, and Pinchin and Owner specific requirements.

.3 Comply with requirements of this Section when performing following Work:

.1 Use of power tool to cut, grind, or polish concrete, masonry, terrazzo and refractory materials.

.2 Use of power tool to remove silica-containing materials.

.3 The use of a power tool indoors to chip or break, and remove concrete, masonry, stone, terrazzo or refractory materials.

1.3 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of silica.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section including decontamination of the worker.

.5 Instruction and training must be provided by a competent person.

1.4 Personal Protection

.1 Provide the following respiratory protection to all personnel, at minimum:

.1 Non-powered full-face respirators with P100 high efficiency cartridge filters.

.2 Provide protective clothing, to all personnel entering the Abatement Work Area, including:

.1 Disposable protective clothing that does not readily retain dust or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

1.5 Inspections

.1 Refer to Part 1.13 Inspections in Section 02 81 00 – General Provisions.

.2 The following Milestone Inspections are to be scheduled:

.1 Milestone Inspection - Clean Site Preparation

.2 Milestone Inspection - Visual Clearance

PART 2 PRODUCTS AND FACILITIES

.1 Refer to Section 02 81 00.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: One layer of rip-proof polyethylene sheeting installed floor to ceiling, secured with telescopic poles, clips, or other suitable methods.

.2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

.3 Windows: Install sufficient transparent windows area in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Transfer Room

.1 Install vented wood door in wood frame at doorway to Occupied Area. Door must have locking passage set. Provide two keys to Abatement Consultant and one to Owner.

.2 Transfer Room to be generally 2000 mm x 2000 mm x 2200 mm high. Increase size accordingly to accommodate number of workers.

.3 Install walls as follows:

.1 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.2 Install one layer rip-proof polyethylene sheeting on interior walls of Transfer Room.

.4 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire Transfer Room.

.5 Install one layer rip-proof polyethylene sheeting over roof.

.6 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.7 Install a fire extinguisher, mount to wall.

2.4 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors to Abatement Work Area and both ends of Transfer Room.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

PART 3 EXECUTION

3.1 Site Preparation - General

.1 Stored or non-fixed items, including but not limited to equipment, furniture, waste etc., shall be removed from the Abatement Work Area prior to abatement work.

.2 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.3 Provide amended water for wetting materials, and adequate method of wetting (garden sprayers, airless sprayers, etc.).

.4 Provide electrical power and shut off for operation of powered tools and equipment. Provide ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard.

.1 Ensure safe installation of electrical lines and equipment.

.5 Do not use compressed air to clean or remove dust or debris.

.6 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

.8 Remove standing water on polyethylene/floor at the end of every shift.

.9 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Abatement Work Area at end of shift.

3.2 Site Preparation – Enclosure Required

.1 Install Curtained Doorways.

.2 Install polyethylene sheeting at openings in walls (as required) and seal.

.3 Seal openings in floor using tape, polyethylene, etc. Floor openings are to be sealed independently prior to installation of floor polyethylene.

.4 Install 6 mil polyethylene sheeting on walls to remain, within the Abatement Work Area., including existing walls that make up, or are within, the Abatement Work Area.

.5 Install one layer of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Abatement Work Area that may be damaged.

.6 Place required tools to complete the abatement with the Abatement Work Area.

.7 Install temporary lighting in enclosure to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.8 Establish negative pressure in Abatement Work Areas as follows:

.1 Provide sufficient HEPA filtered negative pressure machines to exchange a volume of air equivalent to that of the Abatement Work Area a minimum of every 20 minutes.

.2 Provide additional HEPA filtered negative pressure machines as required to ensure air flow from Occupied Area into Abatement Work Area.

.3 Operate HEPA filtered negative pressure machines continuously from first disturbance of materials until completion of dismantling.

.4 Replace prefilters to maintain specified flow rate.

.5 Replace HEPA filter as required to maintain flow rate and integrity of unit.

.6 Discharge HEPA filtered negative air machines to building exterior, where possible.

.1 Direct discharge away from building access points.

.9 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of a silica dust hazard.

3.3 Maintenance of Abatement Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Abatement Work Area.

.3 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

3.4 Silica Handling

.1 Construct an enclosure around Abatement Work Area and use the procedures described above under *Site Preparation – Enclosure Required*, for the following work:

.1 Use of power tool to cut, grind, or polish concrete, masonry, terrazzo and refractory materials.

.2 Use of power tool to remove silica-containing materials.

.3 The use of a power tool indoors to chip or break, and remove concrete, masonry, stone, terrazzo or refractory materials.

.2 Provide washing facilities consisting of a wash basin, clean water, soap and towels.

.1 Workers are to use washing facilities each time leaving the Abatement Work Area.

.3 Removal methods minimizing dust generation should be used wherever possible.

.1 Wet methods are to be used to reduce dust generation.

.1 Wetting agents should be used where possible.

.2 Wet methods should not be used if it creates a hazard or cause damage to equipment or to project.

.2 Power tools to be equipped with a shroud, and to be kept flush with surface.

.4 Waste generated should be maintained wet until cleaned.

END OF SECTION

Rough Carpentry

Part 1 General

1.1 SECTION INCLUDES

.1 Sheathing.
.2 Miscellaneous rough carpentry, including:
  .1 Wood blocking.
  .2 Telephone and electrical panel backboards.
.3 Fasteners.

1.2 RELATED REQUIREMENTS

.1 Section 08 11 13 - Metal Doors and Frames: Door openings to receive wood blocking.
.2 Section 08 11 16 - Aluminum Doors and Frames: Door openings to receive wood blocking.
.3 Section 08 44 13 - Aluminum-Framed Storefronts (Thermally Broken): Window openings to receive wood blocking.

1.3 REFERENCE STANDARDS

.1 ANSI A135.4-2020 - Basic Hardboard.
.2 ASTM A123/A123M-17 Standard specification for zinc (hot-dip galvanized) coatings on iron and steel products
.3 ASTM A153/A153M-16a Standard specification for zinc coating (hot-dip) on iron and steel hardware
.4 ASTM A653/A653M-20 Standard specification for steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot-dip process
.5 CAN/CGSB 11.3-M87 Hardboard
.6 Canadian plywood handbook
.7 CSA O80 SERIES:21 Wood preservation
.8 CAN/ULC-S706.1-2020 - Standard for Wood Fibre Insulating Boards for Buildings.
.9 STD O121-17 Douglas fir plywood
.10 STD O151-17 Canadian softwood plywood
.11 CSA O153:19 Poplar plywood
.12 CSA O325:21 Construction sheathing (adopted NIST PS 2-18, with Canadian deviations)
.13 STD O437 SERIES-93 Standards on OSB and waferboard
.14 Standard grading rules for Canadian lumber
.15 STD A208.1-2016 Particleboard

1.4 ACTION SUBMITTALS

.1 Section 01 33 00: Submission procedures.

1.5 INFORMATIONAL SUBMITTALS

.1 Section 01 33 00: Submission procedures.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

1.7 QUALITY ASSURANCE

.1 Perform Work in accordance with the following agencies:
  .1 Lumber Grading Agency: Certified by NLGA Grading Rules.
  .2 Plywood Grading Agency: Certified by CANPLY.
  .3 Wood Based Panel Products: Marked with a recognized, visible grade stamp showing Grade or span rating as required.
.2 Pressure Preservative Treated Wood: Marked with certification mark authorized by the Canadian Wood Preservers Bureau (CWPB) indicating producer, preservative type, retention and Use Category (UC).

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Store plywood panels flat and level.
.2 Keep finish faces inward and cover stacks to protect from bumping and abrasion.
.3 Protect tongue and groove plywood panel edges and corners.
.4 Protect panels from sunlight, water or excessive humidity.
.5 Store materials off the ground, covered with weatherproof tarps.

Part 2 Products

2.1 LUMBER MATERIALS

.1 Dimension Lumber: CSA-O141, softwood lumber unless indicated otherwise, S4S, maximum moisture content 19%; graded to NLGA Grading Rules Standard Grading Rules for Lumber. Finger jointed lumber not acceptable.
  .1 Utility Shelving: Grade Construction, species: any species.
  .2 Blocking, Nailing Strips, Curbs, and Sleepers: Grade Construction, species: any species; exterior wood pressure preservative treated.

2.2 PANEL MATERIALS

.1 Plywood: CSA-O121 as indicated in schedule below, CANPLY certified and graded, meeting the requirements of CSA-O325.
  .1 Wall Sheathing: CSA-O151, Sheathing grade, 16 mm thickness, tongue and groove edges.
  .2 Roof Sheathing: CSA-O151, Sheathing grade, thickness 16 mm, tongue and groove edges.
  .3 Single Floor Sheathing: Plywood sheathing boards, Single Floor grade, thickness 2 layers of 16 mm.
  .4 Telephone and Electrical Panel Back Boards: Plywood, thickness 16 mm, S1S.
.2 Particleboard: NPA A208.1, cellulosic composite panel bonded together with a synthetic resin.
.3 Hardboard: CAN/CGSB 11.3, heat and pressure consolidated interfelted ligno-cellulosic fibreboard.
.4 Paper-Faced Gypsum Board Sheathing: ASTM C1396/C1396M, paper-faced with water-resistant core; nominal width 1220 mm, maximum length in place; square edges.
  .1 Wall Sheathing: Regular and Fire rated core, 13 mm and 16 mm thickness, nominal width 1220 mm.

.5 Glass-Mat Faced Gypsum Board Sheathing: ASTM C1177/C1177M, glass-mat faced with water-resistant core; nominal width 1220 mm, maximum length in place; square edges.
.1 Wall Sheathing: Regular and Fire rated core, 16 mm thickness, nominal width 1220 mm.

2.3 FASTENERS AND ANCHORS

.1 Screws and Nails: Stainless steel Type 304; type and size suitable for application.
.2 Anchors: Stainless steel Type 304; type and size suitable for application.

2.4 MISCELLANEOUS ACCESSORIES

.1 Adhesives: Waterproof adhesive, approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

2.5 FINISHES

.1 Galvanized Coating for Use with Treated Wood and High Humidity Areas:
.1 Connectors: Hot dip galvanized to ASTM A653/A653M, Z550 zinc coating designation.
.2 Fasteners and Anchors: Hot dip galvanized to ASTM A153/A153M.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.
.2 Verify that site conditions are ready to receive work and opening dimensions are as instructed by the manufacturer.

3.2 FRAMING

.1 Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
.2 Place horizontal members, crown side up.
.3 Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
.4 Coordinate curb installation with installation of parapet construction.

3.3 SHEATHING

.1 Secure wall sheathing with long dimension parallel to wall studs, with ends over firm bearing and staggered.

3.4 GYPSUM SHEATHING INSTALLATION

.1 Install components to manufacturer's written instructions.
.2 Coordinate location of openings and through-wall components with other work.
.3 Erect gypsum sheathing vertically, with edges butted tight and ends occurring over firm bearing.
.4 Use screws when fastening gypsum board to furring or framing.
.5 Place gypsum soffit board perpendicular to supports, with staggered end joints over supports.
.6 Treat cut edges and holes in sheathing with sealant.

.7 Place sealable exterior control joints consistent with lines of building spaces to maximum spacing of 10 m, as indicated on Drawings. Form joint with back-to-back casing beads spaced apart to form a flexible sealant joint.

.8 Place corner beads at external corners as indicated.

.1 Use longest practical length.

.2 Place edge trim where gypsum board abuts dissimilar materials as indicated.

3.5 FLEXIBLE FLASHING

.1 Install flexible flashing to manufacturer's written instructions.

.2 Lap seams and junctions with other materials minimum 100 mm.

3.6 SITE APPLIED WOOD TREATMENT

.1 Apply preservative treatment to manufacturer's written instructions.

.2 Brush apply two (2) coats of preservative treatment on wood requiring cutting or drilling after treatment and on wood in contact with cementitious materials.

.3 Allow preservative to dry prior to erecting members.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI)
- .1 ANSI/ASME 18.6.1 1981 (R2012) Wood Screws (Inch Series).
- .2 ANSI/BHMA A156.9-2010, Cabinet Hardware.
- .3 ANSI/BHMA A156.11-2014, Cabinet Locks.
- .4 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
- .5 ANSI/BHMA A156.18-2012, Materials and Finishes.
- .6 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.
- .7 ANSI A208.1-09, Particleboard.
- .8 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
- .9 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
- .1 Architectural Woodwork Standards (AWMAC AWS), 2014.

.3 ASTM International (ASTM)
- .1 ASTM A 153/A 153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .2 ASTM E 1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
- .3 ASTM F1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.4 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-11.3-M87, Hardboard.
- .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.

.5 CSA Group (CSA)
- .1 CSA O112-M Series 1977 (R2006) Standards for Wood Adhesives.
- .2 CSA O121-08(R2013), Douglas Fir Plywood.
- .3 CSA O141-05 (R2014), Softwood Lumber.
- .4 CSA O151-14, Canadian Softwood Plywood.
- .5 CSA O153-M1980 (R2014), Poplar Plywood.
- .6 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.

.6 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.7 Green Seal Environmental Standards (GS)
- .1 GS-11-2015, Paints, Coatings, Stains and Sealers.
- .2 GS-36-2013, Adhesives for Commercial Use.

.8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Safety Data Sheets (SDS).

.9 National Electrical Manufacturers Association (NEMA)
- .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).

.10 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.
.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.11 Sustainable Forestry Initiative (SFI)
.1 SFI-2015-2019 Standard and Rules.

1.2 PREINSTALLATION MEETING

.1 Before enclosing framing, convene a meeting of contractor, casework fabricator, casework installer, framing subcontractor and Consultant.
.1 Review locations of backing required for casework installation as shown on shop drawings and as necessary for installation.
.2 Review method of attachment for backing to wall system.
.3 Review coordination with other affected sections.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data:
.1 Prepare and submit material list in accordance with AWMAC AWS, cross-referenced to specifications.
.2 Include manufacturer's instructions, printed product literature, data sheets and catalogue pages for all materials and products to be incorporated into architectural wood casework and include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
.3 Hardware List:
.1 Submit hardware list cross-referenced to specifications.
.2 Include manufacturer's specification sheets indicating name, model, material, function, finish, BHMA designations and other pertinent information.
.4 Shop Drawings:
.1 Prepare and submit shop drawings in accordance with AWMAC AWS and as follows.
.2 Submit electronic sets of shop drawings for initial review in accordance with requirements of Division 01. Revise as directed, submit electronic copies for final acceptance and distribution.
.3 Indicate details of construction, profiles, jointing, fastening and other related details.
.1 Scales: profiles full size, details half full size.
.4 Indicate materials, thicknesses, finishes and hardware.
.5 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
.6 Show location on casework elevations of backing required in supporting structure for attachment of casework.
.7 Indicate AWMAC AWS quality grade where different from predominant grade specified.
.8 Include color schedule of all casework items, including all countertop, exposed, and semi-exposed cabinet finishes, finish material manufacturer, pattern, and color.
.5 Samples:

.1 Prepare and submit samples in accordance with AWMAC AWS and as follows.
.2 Apply sample finishes to specified substrate or core material minimum 300 x 300 mm to match. For veneers with transparent finish submit three samples to illustrate range and colour of grain expected.
.3 Shop applied coatings:
.1 For opaque finish, submit triplicate samples for each colour selection, finished as specified.
.4 Submit duplicate samples of laminated plastic for each specified colour selection.
.5 Submit duplicate samples of laminated plastic joints, edging, cutouts and post-formed profiles.
.6 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.7 Submit statement of experience and qualifications of architectural wood casework fabricator.

1.4 QUALITY ASSURANCE

.1 Perform Work of this Section by single architectural wood casework fabricator with minimum 5 years of current architectural casework production experience and having completed minimum one project in the past 5 years with value within 20% of the cost of the work of this Section.
.2 Mock-ups:
.1 Construct mock-ups in accordance with Section 01 43 00 - Quality Assurance.
.2 Shop prepare one coat cubbie, complete with hardware and shop applied finishes, and install where directed by Consultant
.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with Work.
.4 When accepted, mock-up will demonstrate minimum standard for Work.
.5 Do not proceed with work before receipt of written acceptance of mock-up by Consultant.
.6 Accepted mock-up may not remain as part of finished work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
.2 Deliver wood casework only when area of work is enclosed, plaster and concrete work is dry, and area is broom clean and site environmental conditions are acceptable for installation.
.3 Protect millwork against dampness and damage during and after delivery.
.4 Store millwork in ventilated areas, protected from extreme changes of temperature and humidity, and within range recommended by AWMAC AWS for location of project.
.5 Store materials indoors in clean, dry, well-ventilated area.
.6 Protect architectural woodwork and hardware from nicks, scratches, and blemishes.

.7 Replace defective or damaged materials with new.

Part 2 Products

2.1 QUALITY GRADE

.1 Provide all materials and perform all fabrication in accordance with AWMAC AWS Custom Grade and as follows, except where specified otherwise:
  .1 Premium Grade:.
.2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

2.2 LUMBER

.1 Softwood and Hardwood Lumber: Sound lumber to specified AWMAC AWSquality grade requirements, kiln-dried to moisture content recommended by AWMAC AWS for location of the Work
.2 Machine stress-rated lumber is acceptable for all purposes.
.3 Face framing, pulls, trims, molding, edge-banding, stiles and rails: as indicated on drawings, species, in profiles indicated.

2.3 PANEL MATERIALS

.1 Interior mat-formed wood particleboard: to ANSI/NPA A208.1, industrial grade M-2 or M-3, medium density (640-800 kg/m^3), thickness 19 mm unless indicated otherwise.
.2 Douglas fir plywood (DFP): to CSA O121, standard construction
.3 Hardwood plywood: to ANSI/HPVA HP-1.
.4 Canadian softwood plywood (CSP): to CSA O151, standard construction
.5 Poplar plywood (PP): to CSA O153, standard construction
.6 Hardboard: To CAN/CGSB-11.3

2.4 LAMINATED PLASTIC MATERIALS

.1 Laminated plastic for flatwork: to NEMA LD3
  .1 High pressure decorative laminated (HPDL) plastic.
    .1 Type: GP (general purpose).
    .2 Horizontal Surfaces: HGS to suit application, 1.2 mm thick.
    .3 Vertical Surfaces: VGL to suit application, 0.71 mm thick.
    .4 Colour: integral colour throughout, multilayered.
    .5 Pattern: allow for 3 colours, and 3 patterns.
    .6 Finish: allow for 5 finishes.
    .7 Manufacturers:
      .1 Formica.
      .2 Laminart.
      .3 Nevamar.
      .4 Wilsonart.
  .2 Laminated plastic for backing sheet:
    .1 Type: backer.
    .2 Grade: BKL.
    .3 Thickness: not less than 0.5 mm thick or same thickness as face laminate.
    .4 Colour: same colour as face laminate.

.3 Thermofused Melamine: to NEMA LD3Grade LPDL, Grade M3 particleboard.
.1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
.4 Edge finishing for doors, drawer fronts, shelves and false fronts:
.1 HPDL to match face.
.2 PVC: solid colour to match face, 2 mm thick.
.3 Matching melamine and polyester overlay edge strip with thermoplastic adhesive.
.4 Edges dadoed or saw kerfed to take plastic "T" moulding in width and colour to match face.
.5 Laminated plastic adhesive:
.1 Adhesive: using non-toxic glue to 19 mm thick, two component epoxy thermosetting adhesive.

2.5 CASEWORK FABRICATION - GENERAL

.1 Fabricate casework of specified core and surface finish materials to specified AWMAC AWS quality grade
.1 Construction type: frameless.
.2 Set nails and countersink screws apply stained wood filler to indentations, sand smooth and leave ready to receive finish.
.3 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
.4 Shelving to cabinetwork to be adjustable unless otherwise noted.
.5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
.6 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
.7 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

2.6 LAMINATED PLASTIC CASEWORK FABRICATION

.1 Do laminated plastic fabrication in compliance with NEMA LD3, Annex A and specified AWMAC AWSquality grade
.2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
.3 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.
.4 Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.
.5 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
.6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
.7 Apply laminated plastic liner sheet to interior of cabinetry.

2.7 CABINET HARDWARE

.1 Cabinet hardware: to AWMAC AWSquality grade specified and to ANSI/BHMA A156.9, designated by letter B and numeral identifiers as listed below
.2 Finish:
  .1 As selected by the consultant.
.3 Drawer Slides:
  .1 Acceptable manufacturers:
    .1 Knape & Vogt.
    .2 Accuride.
  .2 Type 1: Regular duty, typical drawer slide: 100lb, telescoping, full extension, on precision steel ball bearings, length to suit, unless otherwise indicated on drawings.
.4 Cabinet door hinges:
  .1 165 degree opening (where possible), European concealed hinge, full overlay.
  .2 Acceptable Product:
    .1 Salice ‘Series 200’.
    .2 Substitutions: in accordance with Section 01630.
.5 Pilaster strips and recessed wall standards:
  .1 Recessed, slotted, nickel plated, and stainless steel as indicated on drawings
  complete with brackets/clips.
.6 Door and drawer handles:
  .1 150 mm (6”) ‘D’ pull profile, stainless steel, brushed finish.
.7 Drawer and cabinet locks:
  .1 Acceptable Products:
    .1 Hafele ‘Timberline Series’
    .2 Substitutions: in accordance with Section 01630.

2.8 FASTENERS AND ADHESIVES

.1 Fasteners shall comply with North American Architectural Woodwork Standards 4.0.
.2 Adhesives: Shall be used for intended purpose and manufacturer materials applications and installation, applied in accordance with manufacturer’s written requirements and shall comply with the “adhesive usage guidelines” recommendations of North American Architectural Woodwork Standards 4.0

2.9 FABRICATION - SOLID SURFACING

.1 Fabricate components in shop to greatest extent practical to size and shape indicated, in accordance with reviewed shop drawings and manufacturer's written requirements.
.2 Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids. Attach 100 mm (4") wide solid surfacing material reinforcing strip under joints.
.3 Provide holes and cut-outs as indicated or as required.
.4 Rout and finish component edges to a smooth, uniform finish. Rout cut-outs then sand edges smooth. Repair or reject defective or inaccurate work
.5 Surfaces shall have a uniform finish.

2.10 ACCESSORIES

.1 Wood screws: stainless steel, type and size to suit application.
.2 Nails and staples: to CSA B111 and ASTM F1667
.3 Splines: wood.
.4 Sealant: in accordance with 07 92 00 - Joint Sealants.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INSTALLATION

.1 In case of conflict between Contract Documents and AWMAC AWSgrade requirements, Contract Documents govern.
.2 Install prefinished millwork at locations shown on drawings.
  .1 Position accurately, level, plumb straight.
.3 Fasten and anchor millwork securely.
  .1 Supply and install heavy duty fixture attachments for wall mounted cabinets.
.4 Countersink mechanical fasteners at exposed and semi-exposed surfaces, excluding installation attachment screws and screws securing cabinets end to end.
.5 Use draw bolts in countertop joints.
.6 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
.7 Apply moisture barrier between wood framing members and masonry or cementitious construction.
.8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
.9 Make cutouts for inset equipment and fixtures using templates provided.

3.3 CLEANING

.1 Progress Cleaning:
  .1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with manufacturers written instructions.
  .1 Remove excess glue, pencil and ink marks from surfaces.

3.4 PROTECTION

.1 Protect millwork from damage until final inspection.
.2 Protect installed products and components from damage during construction.
.3 Repair damage to adjacent materials caused by architectural woodwork installation.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Environmental Product Declaration (EPD): Third-party verified documentation with the supporting Product Category Rule (PCR) and Life cycle assessment information. Prepared in accordance with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
- .1 Industry-wide (generic) EPD with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.
- .2 Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):
- .1 ASTM C167-18, Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations
- .2 ASTM C423-17 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .3 ASTM C553-19, Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications
- .4 ASTM C665-17, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .5 ASTM C1320-20, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction
- .6 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .7 ASTM E413-16, Classification for Rating Sound Insulation
- .8 ASTM F1667-18a, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples

.2 CSA Group (CSA):
- .1 CSA B111-1974, Wire Nails, Spikes and Staples
- .2 CSA B149 PACKAGE-20, Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
- .1 Safety Data Sheets (SDS)

.4 Underwriters Laboratories of Canada (ULC):
- .1 ULC 102- 18, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (CAN/ULC S102)
- .2 ULC 114-18, Standard Method of Test for Determination of Non-Combustibility in Building Materials
- .3 ULC 604, Standard for Factory-Built Type A Chimneys (CAN/ULC-S604-16)
- .4 ULC 702, Standard for Mineral Fibre Insulation for Buildings (CAN/ULC-S702-15)

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate building envelope commissioning with Section 01 91 13 - General Commissioning Requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Product Data: Submit manufacturer's instructions, product literature and data sheets for blanket insulation. Include product characteristics, performance criteria, physical sizes, and limitations.
.3 Certificates: When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
.4 Test Reports: When requested, submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements
.2 Storage and Handling Requirements:
  .1 Store materials in a clean dry location and in accordance with manufacturer's recommendations.
  .2 Store and protect blanket insulation fromdamage
.3 Packaging Waste Management: Perform in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: Non-combustible, stone wool batt insulation to CAN/ULC-S702.
  .1 Type: 1.
  .2 Fire performance:
    .1 Non-combustibility: To CAN/ULC S114.
      .1 Flame spread: 0
      .2 Smoke developed: 5
    .2 Surface Burning Characteristics: To CAN/ULC S102.
      .1 Flame spread: 0
      .2 Smoke developed: 0
  .3 Density:> 2.5 lbs/ft3 (>40 kg/m3)t to ASTM C167
  .4 Thickness: as indicated.
  .5 Manufacturers:
    .1 Acoustic Fire Batt Insulation (AFB) by Rockwool.
    .2 or approved equal.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed are acceptable for blanket insulation application in accordance with manufacturer's instructions.
  .1 Verify all in wall construction is complete.

.2 Verify building substrates are dry.
.3 Inform Consultant of unacceptable conditions immediately upon discovery.
.4 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSULATION INSTALLATION

.1 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
.2 Fill stud space of exterior framed walls with insulation full depth of stud only where no insulation/vapour retardant indicated on exterior face of stud walls.
.3 Do not compress insulation to fit into spaces.
.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from vents.
.5 Do not enclose insulation until it has been reviewed and is acceptable by Consultant.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 ASTM International (ASTM):
- .1 ASTM C411- 19, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
- .2 ASTM C518- 17, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .3 ASTM C1029- 20, Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
- .4 ASTM C1338- 19, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- .5 ASTM D1621- 16, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics
- .6 ASTM D1622- 20, Standard Test Method for Apparent Density of Rigid Cellular Plastics
- .7 ASTM D1623- 17, Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- .8 ASTM D2126- 20, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- .9 ASTM D2369- 20, Standard Test Method for Volatile Content of Coatings
- .10 ASTM D2842- 19, Standard Test Method for Water Absorption of Rigid Cellular Plastics
- .11 ASTM D6226- 21, Standard Test Method for Open Cell Content of Rigid Cellular Plastics
- .12 ASTM E96/E96M- 16, Standard Test Methods for Water Vapor Transmission of Materials

.2 Green Seal Environmental Standards (GS):
- .1 Standard GC-03- 97, Anti-Corrosive Paints
- .2 Standard GS-11- 2011, Paints and Coatings

.3 South Coast Air Quality Management District (SCAQMD), California State:
- .1 SCAQMD Rule 1113- 2016, Architectural Coatings

.4 ULC Standards (ULC):
- .1 CAN/ULC S101 14, Standard Methods of Fire Endurance Tests of Building Construction and Materials
- .2 ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .3 CAN/ULC-S127- 14, Standard Corner Wall Method of Test for Flammability Characteristics on Non-Melting Foam Plastic Building Materials
- .4 ULC-705.1- 15, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification. Includes Amendment 1.2
- .5 ULC-705.2- 05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application

.6 ULC 711.1- 2019, Standard for Thermal Insulation - Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1: Material Specification
.7 CAN/ULC S711.2- 11, Standard for Thermal Insulation - Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 2: Installation
.8 ULC 718- 13, Standard for Site Quality Assurance Program for Spray Polyurethane Foam
.9 CAN/ULC S770 15, Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams
.10 CAN/ULC S774- 2020, Standard Laboratory Guide for the Determination of Volatile Organic Compound Emissions from Polyurethane Foam

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate building envelope commissioning activities with Section 01 91 13 - General Commissioning Requirements.
.2 Pre-installation meeting: Convene a meeting two weeks before beginning work of this Section or any on-site preparation or application. Contractor, Insulation Subcontractor ,manufacturer and Consultant will review the following:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Coordination with other Subcontractors.
.4 Review manufacturer's installation instructions.
.5 Preparation of Mock-Up(s).
.6 On-site testing and inspections.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit manufacturer's product literature, specifications and data sheets. Include product characteristics, performance criteria, and limitations.
.3 Submit manufacturer's installation instructions. Include preparation instructions, recommendations for special storage and handling. Include installation sequence and cleaning procedures.
.4 Submit WHMIS Safety Data Sheet (SDS).
.5 When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.
.6 Submit evaluation report, test reports and listing from an independent recognized evaluation service or testing laboratory, indicating compliance with specifications for specified performance characteristics and physical properties.
.7 Submit test reports verifying compliance with ULC-102 for surface burning characteristics.
.8 Submit Manufacturer's Site Reports as described in PART 3 - SITE QUALITY CONTROL. Submit manufacturer's written reports within 3 days of inspection. Submit Manufacturer's Site Reports as described in PART 3 - SITE QUALITY CONTROL. Submit manufacturer's written reports within 3 days of inspection.

1.4 QUALITY ASSURANCE

.1 Manufacturer: company with experience in producing material required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.

.2 Installer: Person specializing in sprayed insulation installations with documented experience. Approved by manufacturer. Installer to becertified by an ISO 17024 accredited certification organization in accordance with the requirements in ULC 705.2. Submit copies of licenses to Consultant for each installer.

1.5 HEALTH AND SAFETY

.1 Comply with requirements of Workplace Hazardous Materials Information System regarding use, handling, storage and disposal of insulation materials.

.2 Protect workers in accordance with ULC-705 and manufacturer's recommendations.

.3 Ensure that workers wear gloves, supplied fresh air system, dust masks, long sleeved clothing, eye protection and protective clothing when applying foam insulation.

.4 Ensure that workers do not eat, drink or smoke while applying foam insulation.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements.

.1 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, with manufacturer's labels.

.2 Storage and Handling Requirements:

.1 Store materials off ground, indoors, and in clean, dry, well-ventilated area.

.2 Protect insulation materials from exposure to moisture.

.3 Replace wet or damaged materials with new.

1.7 WASTE MANAGEMENT

.1 Separate and recycle waste packaging materials in accordance with Waste Management Plan and Waste Reduction Plan.

.2 Dispose of waste products at appropriate recycling facilities. Collect and separate paper and plastic material in appropriate on-site storage containers.

.3 Dispose of waste foam daily and decontaminate empty drums in accordance with foam manufacturer's instructions. Divert metal drums to metal recycling facility.

1.8 SITE CONDITIONS

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray and fall-out.

.5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

.1 Insulation: Spray applied closed cell, rigid polyurethane foam to ULC-705.1 and ASTM C1029. Type 2, two-component, Medium density. Zero ozone depletion blowing agent. Properties as follows:
  .1 Core density: to ASTM D1622 Minimum 35.49 kg /m ^{3}.
  .2 Compressive strength, to ASTM D1621: Minimum 171 kPa.
  .3 Tensile strength: Minimum 401 kPa.
  .4 Open cell content, to ASTM D6226: Maximum 5 %.
  .5 Water absorption, to ASTM D2842: less than 0.64 % by volume.
  .6 Dimensional stability, to ASTM D2126: aged 28 days at 70° C at 97% RH plus/minus 3%: less than -0.1%, +8.5%, -0.3 % by volume.
  .7 Long Term Thermal Resistance: Minimum RSI 0.97 per 25 mm thickness.
  .8 Air permeance at 50 mm thickness, to ASTM E2178: 0.0021 litres per second per m ^{2}.
  .9 Water vapour permeance at 25 mm thickness, to ASTM E96: less than 60 ng/Pa x second x m ^{2}.
  .10 Maximum thickness per pass: 25 mm.
  .11 Surface burning characteristics: to ULC 102.
    .1 Smoke Developed Classification: Maximum 500.
    .2 Flame-Spread Rating, to CAN/ULC S127: Maximum 235.
.2 Primers: in accordance with manufacturer's recommendations for surface conditions.
  .1 Maximum VOC limit 100 g/L.

2.2 EQUIPMENT

.1 Spray equipment: In accordance with ULC-705.2 and the equipment manufacturer's recommendations for specific type of application
.2 Provide a separate proportioner unit for each spray gun.

Part 3 Execution

3.1 EXAMINATION

.1 Verify that conditions of existing substrate are acceptable for sprayed insulation application in accordance with manufacturer's instructions.
  .1 Inspect substrate in presence of Consultant
  .2 Ensure surfaces are free of snow, ice, frost, grease and other deleterious materials.
  .3 Measure moisture content and temperature of substrate and surface suitability in accordance with ULC-705.2. Measurements below ULC-705.2 requirements are not acceptable
  .4 Inform Consultant of unacceptable conditions immediately upon discovery.
  .5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

.1 Protection of In-Place Conditions:
  .1 Mask and cover adjacent areas to protect from over spray.
  .2 Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.

.3 Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.

.4 Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spay area.

.2 Surface Preparation:

.1 Clean all surfaces free of oil, grease, dust and debris. Ensure surfaces are clean, dry and properly fastened to ensure adhesion of the foam to the substrate.

.2 Ensure that all work by other Subcontractors that may penetrates through the insulation is in place and complete.

3.3 APPLICATION

.1 Apply primer to surfaces where recommended by manufacturer. Apply primer in accordance with manufacturer's instructions.

.2 Spray apply insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Spray apply insulation to primed surfaces in accordance with ULC-705.2

.4 Record equipment settings on the Daily Work Record as required by ULC-705.2

.5 Spray apply insulation to final thickness as indicated on Drawings. Apply in consecutive passes to thicknesses as recommended by manufacturer. Minimum thickness: 15 mm. Maximum thickness: 50 mm.

.6 Spray insulation to seal perimeter of electrical boxes, pipes, ducts, frames and other objects into or passing through insulation.

.7 Keep insulation away from heat emitting devices such as recessed light fixtures, chimneys and furnace vents. Maintain minimum distances as recommended by manufacturer's instructions.

.8 Finished surface of foam insulation to be free of voids and imbedded foreign objects.

.9 Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed under other sections.

.10 Trim, as required, any excess thickness that would interfere with the application of cladding system by other Subcontractors.

.11 Do not enclose insulation until it has been reviewed and is acceptable to Manufacturer.

.12 Tolerances: Maximum variation from indicated thickness: minus 6 mm, plus 10 mm but not universally high or low.

3.4 SITE QUALITY CONTROL

.1 Provide Manufacturer's Site Services consisting of product use recommendations and regular site visits to inspect product installation to ensure compliance with manufacturer's instructions.

3.5 CLEANING

.1 Upon completion of insulation work, remove surplus materials, rubbish, tools and equipment.

.1 Remove insulation material spilled and oversprayed during installation and leave work area clean.

3.6 PROTECTION

.1 Protect installed products and accessories from damage during construction.

.1 Protect the spray foam from ultraviolet light in accordance with manufacturer's requirements.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Tested and listed firestopping systems.

1.2 RELATED REQUIREMENTS

.1 Section 05 12 00 - Structural Steel: Building structural substrate surfaces.
.2 Section 07 26 00 - Vapour Retarders: Vapour retarder materials to adjacent insulation.
.3 Section 07 27 00 - Air Barriers: Air barrier materials to adjacent insulation.
.4 Section 07 81 00: Spray applied fireproofing.
.5 Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.
.6 Division 23 – Heating, Ventilating, and Air-Conditioning (HVAC): Mechanical work requiring firestopping.
.7 Section 26 - Electrical: Electrical work requiring firestopping.

1.3 REFERENCE STANDARDS

.1 ASTM E84-21a Standard test method for surface burning characteristics of building materials
.2 ASTM E119-20 Standard test methods for fire tests of building construction and materials
.3 ASTM E814-13a(2017) Standard test method for fire tests of penetration firestop systems
.4 ASTM E1966-15(2019) Standard test method for fire-resistive joint systems
.5 CAN/ULC-S101-14 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
.6 CAN/ULC-S102-18 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.7 CAN/ULC-S102.2-18 - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
.8 CAN/ULC-S115-18 - Standard Method of Fire Tests of Firestop Systems.
.9 FM (Factory Mutual) - FM 4991-2013 - Approval Standard for Firestop Contractors.
.10 Firestop industry manual of practice (FCIA MOP)
.11 NFPA 251 - Standard Methods of Tests of Fire Endurance of Building Construction and Materials, 2006 edition.
.12 OPL (Omega Point Laboratories).
.13 UL 263-2011 - Standard for Fire Tests of Building Construction and Materials (14th Edition).
.14 UL 1479-2015 - Standard for Fire Tests of Through-Penetration Firestops (4th Edition).
.15 UL 1709-2017 - Standard for Rapid Rise Fire Tests of Protection Materials for Structural Steel (5th Edition).
.16 UL 2079-2015 - Standard for Tests for Fire Resistance of Building Joint Systems (5th Edition).
.17 ULC-FR-17 - Fire Resistance Directory (2017 Edition).
.18 WHI (Intertek/Warnock Hershey).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Section 01 31 00: Project management and coordination procedures.
.2 Coordination: Coordinate with other work having a direct bearing on work of this section.
.3 Sequencing: Coordinate and sequence firestopping installation with all affected trades.

1.5 ACTION SUBMITTALS

.1 Section 01 33 00: Submission procedures.
.2 Product Data: Provide manufacturer's written data on product characteristics, performance.
.3 System Design Listings: Submit system design listings including illustrations from a qualified nationally recognized testing and inspection agency applicable to each firestop configuration.
.4 Unlisted Firestopping Systems: Obtain an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) from firestop manufacturer where no specific third party tested, listed and classified firestop system is available for a particular firestop configuration.

1.6 INFORMATIONAL SUBMITTALS

.1 Section 01 33 00: Submission procedures.
.2 Installation Data: Manufacturer's written special preparation and installation requirements and tested and listed firestop systems designs.
.3 Contractor's Certificates:
  .1 Provide FCIA Member in Good Standing letter or certificate for the current year, on FCIA letterhead.
  .2 Current ULC Qualified Firestop Contractor Certificate and individual Designated Responsible Individual Certificate.
.4 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.7 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

1.8 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.
.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience and FCIA Manufacturer Member in good standing.
.3 Contractor Qualifications: Company specializing in performing the work of this section and as follows:
  .1 FCIA Member in good standing.
  .2 Minimum one (1) person employed at the firm who has passed the ULC Firestop Exam.
  .3 ULC Qualified Firestop Contractor Program.
  .4 FM approved in accordance with FM standard 4991 - Approval of Firestop Contractors.
  .5 FCIA Member in good standing.

.6 Licensed by the province or local authority where applicable.
.7 Completed not less than five (5) comparable scale projects.

.4 Single Source Responsibility: Obtain firestop systems for each type of penetration and construction situation from a single primary firestop systems manufacturer. Obtain firestop systems for complete project, from a single primary firestop systems manufacturer, to the greatest extent possible.

1.9 MOCK-UPS

.1 Section 01 43 00: Requirements for mock-up.
.2 Provide mock-up of applied firestopping assemblies.
.3 Obtain Consultant's acceptance of mock-up before start of Work.
.4 Retain and maintain accepted mock-ups during construction in undisturbed condition as a standard for judging completed work.

1.10 DELIVERY, STORAGE, AND HANDLING

.1 Section 01 61 00: Transport, handle, store, and protect products.
.2 Deliver firestopping products in original, unopened containers with labels intact and legible, identifying product and manufacturer.
.3 Store and handle firestopping materials to manufacturer's instructions.

1.11 SITE CONDITIONS

.1 Ambient Conditions:
.1 Do not apply materials when temperature of substrate material and ambient air is below 15 degrees C.
.2 Maintain this minimum temperature before, during, and for three (3) days after installation of materials.
.3 Provide ventilation to manufacturer's instructions in areas to receive solvent cured materials.

Part 2 Products

2.1 MANUFACTURERS

.1 Acceptable Manufacturers:
.1 3M Fire Protection Products.
.2 BALCO, Inc.
.3 HILTI, Inc.
.4 Specified Technologies, Inc
.5 Thermal Ceramics, Inc.
.6 Tremco,
.7 Thermafiber, Inc.

2.2 DESCRIPTION

.1 System Description:
.2 Tested and listed firestopping systems consisting of a material or materials, the wall or floor assembly, and penetrating items or gaps, assembled or placed in spaces, gaps, joints and building perimeters, to restore the fire resistance rating and or smoke resistant properties of a fire resistance rated assembly or smoke resistant assembly.
.3 Regulatory Requirements:

.1 Conform to applicable code for fire resistance ratings and surface burning characteristics.
.2 Provide certificate of compliance from authority having jurisdiction indicating approval of materials, tested and listed systems or engineering judgments used.

2.3 PERFORMANCE / DESIGN CRITERIA

.1 Materials, accessories and application procedures listed by ULC, or tested to CAN/ULC-S115 to comply with applicable building code requirements.
.2 Firestopping Materials: CAN/ULC-S101, to achieve a fire rating as noted on Drawings.
.3 Surface Burning Characteristics: CAN/ULC-S102 or CAN/ULC-S102.2, as applicable.
.4 Smoke Resistance: For areas where smoke resistance is required, provide firestop systems with L-ratings of maximum 5.0 cfm/sq ft opening area.
.5 Environmental Resistance: Systems to be resistant to environmental conditions they will be exposed to, as apparent at design stage.

2.4 MATERIALS

.1 Fire Stopping Systems and Materials: Tested and listed by ULC, and conforming to construction type, penetrant type, annular space requirements and fire rating involved in each separate instance.

2.5 ACCESSORIES

.1 Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
.2 Forming/Packing Material: Permanent type, suitable for application.
.3 Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.
.2 Verify opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping are ready to receive the work of this section.
.3 Verify tested and listed systems selected are applicable to the conditions encountered.
.4 Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Clean substrate surfaces as recommended in manufacturer's written instructions, of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material and performance of firestop system for fire or smoke resistant situations.
.2 Remove incompatible materials which may affect bond.

3.3 APPLICATION

.1 Apply primer and firestopping materials to manufacturer's written instructions.

.2 Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping to tested and listed system or engineering judgment.
.3 Apply firestopping material, thickness sufficient to achieve rating, to uniform density and texture.
.4 Compress fibred material to achieve a density of 40% of its uncompressed density.

3.4 CLEANING

.1 Clean installed work.
.2 Clean adjacent surfaces of firestopping materials.

3.5 PROTECTION

.1 Section 01 78 23: Protecting installed work.
.2 Protect adjacent surfaces from damage by material installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 84 00 - Fire Stopping

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):
- .1 ASTM C834-17, Standard Specification for Latex Sealants
- .2 ASTM C919-19, Standard Practice for Use of Sealants in Acoustical Applications
- .3 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants
- .4 ASTM C1193-16, Standard Guide for Use of Joint Sealants
- .5 ASTM C1330-18, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
- .6 ASTM C1481-12, Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS)
- .7 ASTM D1056-20, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber
- .8 ASTM D2240-15e1, Standard Test Methods for Rubber Property, Durometer Hardness
- .9 ASTM D2628-91, Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

.2 Canadian General Standards Board (CGSB) 1330:
- .1 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound

.3 Department of Justice Canada (Jus):
- .1 Canadian Environmental Protection Act, 1999 (2018) (CEPA)

.4 General Services Administration (GSA) - Federal Specifications (FS):
- .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
- .1 Safety Data Sheets (SDS)
- .2 Sealant, Waterproofing, and Restoration Institute (SWRI): Sealants: The Professionals' Guide 2013

.6 Transport Canada (TC):
- .1 Transportation of Dangerous Goods Act, 1992 (2019 amended.) (TDGA)

.7 ULC Standards/ UL Canada (ULC):
- .1 CAN/ULC 115-2018, Standard Method of Fire Tests of Firestop Systems

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Submit manufacturer's product data for each type of primer,backer rod, and sealants and include product characteristics, performance criteria, available colours, compatibility warnings, compliance standards and limitations.
- .2 Manufacturer's product to describe:

.3 Submit one electronic copy of WHMIS SDS.

.3 Samples:
- .1 Submit two samples of each type of joint sealant material and colour.
- .2 Submit two cured samples of exposed sealants of each colour to match adjacent material.

.4 Certificates: When requested by Consultant, submit manufacturer's product certificates indicating proposed sealant is appropriate for each application on this Project.

.5 Manufacturer's Instructions:
- .1 Submit instructions for each type of product.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: Submit maintenance data for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Qualifications:
- .1 Manufacturer: Obtain each type of joint sealant from a single manufacturer.
- .2 Minimum five (5) years successful experience in Work of similar size and complexity.

.2 Compatibility: Ensure sealants are compatible with adjacent materials and are approved by manufacture for use with adjacent materials.

.3 Mock-Ups:
- .1 Construct mock up in accordance with Section 01 43 00 - Quality Assurance.
- .2 Before performing sealant work do sample applications of each type of sealant forreview.
- .3 Site locations for sample applications shall be designated by Consultant.
- .4 Construct joint sealant mock-ups in assemblies of other Sections with joint sealants, which are referenced in this Section.

.4 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to Health Canada.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, with manufacturer's label.

.3 Storage and Handling Requirements:
- .1 Store materials [in a ventilated dry indoor location] and in accordance with manufacturer's recommendations.
- .2 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .3 Do not dispose of unused sealant material into sewer system, streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .4 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.

1.7 AMBIENT CONDITIONS

.1 Proceed with installation of joint sealants only when:
- .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
- .2 Joint substrates are dry.
- .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.8 WARRANTY

.1 Manufacturer's warranty: Provide manufacturer's standard warranty documentation.

.2 Warrant that sealant work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces in accordance with General Conditions, except for three five years.

.3 Installer's Warranty: Provide an installation warranty, installer agrees to repair or replace joint sealants that do not comply with requirements of this Section for two years from Substantial Performance.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Each sealant system shall meet the following requirements for warranty period:
- .1 Waterproof, flexible, and compatible with substrate under applicable service conditions.
- .2 Provide a weather-tight seal that does not allow moisture penetration.
- .3 Shall not de-bond, crack, or craze.
- .4 Shall not leak.

2.2 SEALANT MATERIALS

.1 Provide primers in accordance with manufacturer recommendation.

2.3 SEALANTS

.1 General:
- .1 Colours shall be selected from manufacturer’s full range of colours.
- .2 Comply with ASTM C920-11 and other requirements indicated for each liquidapplied chemically curing sealant, including those referencing ASTM C920-11 classifications for type, grade, class, and uses
- .3 For sealants to be applied to porous substrates: Provide products that have undergone testing according to ASTM C1248-18 and have not stained porous joint substrates indicated for *Work.*
- .4 Sealant supplied shall not exude any material(s) which travels into adjacent materials, or travels onto surfaces of adjacent materials; causing damage, or attracting soiling, which becomes apparent during the service life of the building.

.2 Interior general sealants:
- .1 VOC limit: less than 250 g/L.
- .2 Interior sealant; at joints with painted gypsum board: one-component paintable acrylic or polyurethane sealant in accordance with the following:

.1 Comply with:
.1 ASTM C834-10.
.2 CGSB 19-GP-5M-1984.
.2 Acceptable *Products:*
.1 Sika ‘Sikaflex 1A’.
.2 Tremco, Inc. ‘Tremflex 834’.

.3 Interior sealant; at movement paintable joints in vertical surfaces, no detectible odour: one-component sealant in accordance with the following:
.1 Comply with:
.1 ASTM C920-11, Type M or S, Grade NS, Class 25.
.2 CAN/CGSB 19.13-M87.
.2 Acceptable *Products:*
.1 BASF ‘MasterSeal NP100’.
.2 Sika ‘Sikaflex 15LM’.

.4 Specialty sealants:
.1 Interior mildew resistant one part silicone sealant; healthcare facilities:
.1 Comply with:
.1 FDA Regulation No. 21 CFR 177.2600.
.2 ASTM C920-11, Type S, Grade NT, Class 25
.3 CAN/CGSB 19.22-M89
.2 Acceptable *Products:*
.1 DOWSIL ‘786’.
.2 Substitutions: or approved equal.

2.4 ACCESSORIES

.1 Preformed compressible and non-compressible back-up materials that are non-staining, compatible with joint substrate, sealants, primers, and other joint fillers, and are approved for applications indicated by sealant manufacturer based on site experience and laboratory testing:
.1 Rod Type Sealant Backings:
.1 ASTM C1330, Type C (closed cell material with a surface skin), Type O (open cell material) or Type B (bi cellular material with a surface skin).
.2 Provide any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated.
.3 Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
.4 Non adhering to sealant, to maintain two sided adhesion across joint.
.2 High Density Foam:
.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m ^{3} density, or neoprene foam backer, size as recommended by manufacturer.
.3 Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, non absorbent to water and gas, capable of remaining resilient at temperatures down to 15 deg C. Provide products with

low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

.4 Bond Breaker Tape:

.1 Polyethylene bond breaker tape or other tape recommended by sealant manufacturer which will not bond to sealant.

.2 Preformed Sealants:

.1 Preformed Silicone Sealant System: Manufacturer's standard system consisting of pre-cured low modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral curing silicone sealant for bonding extrusions to substrates.

.2 Preformed Hollow Neoprene Gasket: Manufacturer's standard preformed polychloroprene elastomeric joint seal of the open cell compression type complying with ASTM D2628 and with requirements for size, profile and cross sectional design.

.3 Bond Breaker: Pressure-sensitive plastic tape that will not bond to sealants.

.4 Joint Cleaner: Provide a non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's recommendations

.5 Primer: Provide in accordance with sealant manufacturer's recommendations.

.6 Masking Tape: Non-absorbent type, non-staining, compatible with joint sealant and joint substrates.

2.5 COLOURS

.1 Sealant Colours: Match colour of adjacent materials where visible, as selected by Consultant, from manufacturer's standard colour range.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed are acceptable for joint sealants installation in accordance with manufacturer's instructions.

.1 Visually inspect substrate.

.2 Verify joint surfaces are dry and frost free.

.3 Verify substrates are without contaminants capable of interfering with sealant adhesion. Remove contaminants where occurring.

.4 Examine joint sizes and conditions to establish acceptable depth to width ratio for installation of backup materials and application of sealants.

.5 Verify joint widths are within the limits recommended by joint sealant manufacturer for applications indicated.

.6 Inform Consultant of unacceptable conditions immediately upon discovery.

.7 Proceed with installation only after unacceptable conditions have been remedied.

3.2 SURFACE PREPARATION

.1 Clean bonding joint surfaces of harmful contaminates including dust, rust, oil grease, and other matter which may impair adhesion.

.2 Do not apply sealants to joint substrates treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.3 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Mask adjacent surfaces prior to priming and sealing where necessary to prevent staining.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately applying sealant, except when manufacturer's instructions explicitly state priming is not required.

.3 Prime all porous material (e.g. wood, masonry, concrete, ceramic or paver tile, etc).

3.4 BACKUP MATERIAL

.1 Provide backer rod as specified, to limit depth of sealant and to act as bond breaker at back of joint.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

.3 Apply paper masking tape to back of joint to act as bond break where depth of joint does not permit the use of backer rod.

.4 Ensure that no joints are formed which are bonded on adjacent sides where there is any possibility of movement.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant: Application: Apply sealants to recommendations of ASTM C1193, ASTM C1481, and in accordance with manufacturer's instructions, and as follows:

.1 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 For joints where movement is possible, apply backer rod to achieve a joint depth of one half the joint width but not less than 9 mm; for joints larger than 25 mm use a depth of 13 mm

.4 Apply sealant in a continuous beads.

.5 Apply sealant using gun with proper size nozzle.

.6 Fill voids and joints solid.

.7 Form sealant surface with a smooth full bead, without from ridges, wrinkles, sags, air pockets, embedded impurities.

.8 Tool exposed surfaces before skinning begins to give slightly concave shape.

.9 Ensure bead is solid, filling entire space between sides and bedding material, exerting sufficient pressure to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.

.10 Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature range.

.11 Seal at all locations where dissimilar material meet.

.2 Sealant Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until after curing has completed.

3.7 CLEANING

.1 Progress Cleaning:

.1 Clean adjacent surfaces immediately of excess primers and sealants.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

.2 Final Cleaning

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants
.2 Section 08 71 00 - Door Hardware
.3 Section 08 80 00 - Glazing
.4 Section 09 91 00 - Painting

1.2 REFERENCE STANDARDS

.1 American National Standards Institute/Steel Door Institute (ANSI/SDI):
  .1 ANSI/SDI A250.7- 1997, Nomenclature for Standard Steel Doors and Steel Frames
  .2 ANSI/SDI A250.11- 12, Recommended Erection Instructions for Steel Frames
.2 ASTM International (ASTM):
  .1 ASTM A167- 99, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip (Withdrawn)
  .2 ASTM A653/A653M- 18, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .3 ASTM A780/A780M- 20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
  .4 ASTM A879/A879M- 12, Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
  .5 ASTM A924/A924M- 20, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  .6 ASTM B29- 19, Standard Specification for Refined Lead
  .7 ASTM B749- 20, Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products
  .8 ASTM D4726- 18, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors
  .9 ASTM E90- 09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .10 ASTM E413- 16, Classification for Rating Sound Insulation
  .11 ASTM E1425- 14, Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems
  .12 ASTM F2247- 18, Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method)
.3 CSA Group (CSA):
  .1 CSA G40.20- 13 /G40.21- , General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .2 CSA W59- 18, Welded Steel Construction , Includes Errata (2020)
.4 Canadian Steel Door Manufacturers Association (CSDMA):
  .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000

.2 Recommended Specifications for Commercial Steel Doors and Frames, 2006
.3 Recommended Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009
.4 Storage and Installation Guide, 2012

.5 Fenestration & Glazing Industry Alliance (FGIA) (formerly American Architectural Manufacturers Association (AAMA)):
.1 AAMA 812- 19, Voluntary Practice for Assessment of Frame Deflection When Using One Component Polyurethane Foams for Air-Sealing Rough Openings of Fenestration Installations

.6 National Council on Radiation Protection and Measurements (NCRP):
.1 Report No. 049, Structural Shielding Design and Evaluation for Medical Use of X-Rays and Gamma Rays of Energies up to 10 MeV (1976)

.7 National Fire Protection Association (NFPA):
.1 NFPA 80- 2013, Standard for Fire Doors and Other Opening Protectives
.2 NFPA 252- 2022, Standard Methods of Fire Tests of Door Assemblies

.8 Steel Door Institute (SDI):
.1 SDI-108- 18, Recommended Selection and Usage Guide for Standard Steel Doors
.2 SDI-111- 09, Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components
.3 SDI-122- 15, Installation Troubleshooting Guide for Standard Steel Doors and Frames

.9 Underwriters Laboratories (UL):
.1 UL 2985- 2015, Sustainability Standard for Thermal Insulation

.10 ULC Standards (ULC):
.1 CAN/ULC-S104- 15, Standard Method for Fire Tests of Door Assemblies
.2 CAN/ULC-S105: 2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104
.3 CAN/ULC S106- 15, Standard Method for Fire Tests of Window and Glass Block Assemblies
.4 CAN/ULC-S701.1: 2017, Standard for Thermal Insulation, Polystyrene Boards
.5 CAN/ULC-S702- 14, Standard for Mineral Fibre Thermal Insulation for Buildings
.6 CAN/ULC-S704- 11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:
.1 Coordinate primers for doors and frames with site-applied paint as indicated in Section 09 91 00 - Painting Section ..
.2 Coordinate throat dimensions based on actual material used for wall and partition construction assemblies.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section Section 01 33 00 - Submittal Procedures.

.2 Product Data:
  .1 Submit manufacturer's product data for each type of door and frame. Indicate door designation, type and model, product characteristics, core description, fabrication details, dimensions, fire-protection rating and sound transmission class rating, finishes, and limitations.
  .2 Submit WHMIS Safety Data Sheet (SDS).
.3 Shop Drawings:
  .1 For each type of door, indicate material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, arrangement of hardware, fire-protection rating, sound transmission classification rating, and finishes.
  .2 For each type of frame, indicate material, core metal thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, reinforcing, fire-protection rating, sound transmission classification rating, and finishes.
  .3 Include a schedule identifying each unit with door marks and numbers matching numbering on Drawings and door schedule.
.4 Samples:
  .1 Submit one 305 x 305 -mm door section for all door type, showing corner detail, glazing detail and butt reinforcements.
  .2 Submit one 305 x 305 -mm corner sample of all frame type, illustrating corner detail and welding quality.
  .3 Samples will not be returned for inclusion into work.
.5 Certificates:
  .1 Where fire-protection rated door and frame exceeds size limitations of fire labelled assemblies, submit evidence indicating compliance with fire labelling for door and frame assembly.
.6 Test and Evaluation Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties, as follows:
  .1 Submit test and engineering data, and installation instructions for radiation shielding doors and frames.
  .2 Submit test data indicating compliance with Sound Transmission Class (STC) requirements. Include laboratory name, test report number, and date of test.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section Section 01 78 00 - Closeout Submittals.
.2 Warranty Documentation: Submit manufacturer's material and fabrication warranty.

1.6 QUALITY ASSURANCE

.1 Qualifications:
  .1 Manufacturer: A member in good standing of the Canadian Steel Door Manufacturers Association.
  .2 Installers: Experienced with installation of hollow metal doors and frames of similar complexity and scope to that required for the Project.
  .3 Testing Agencies: Provide doors and frames under label service program of a testing agency acceptable to authorities having jurisdiction (AHJ).

.2 Manufacturer: Obtain doors and frames from a single manufacturer.

.3 Mock-Ups:

.1 Provide site mock-up for work of this Section indicating methods and materials, and proposed procedures to achieve design intent in accordance with Section 01 43 00 - Quality Assurance, and to comply with the following requirements, using materials indicated for completed work:

.1 Build mock-ups in location and size as directed by Consultant.

.2 Obtain Consultant 's acceptance of mock-ups before starting construction.

.3 Use mock-up throughout construction period as a standard of acceptance for work of this Section.

.4 Accepted mock-up may form part of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements and CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

.2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging with manufacturer's labels.

.1 Provide temporary protection during delivery and site storage to prevent distortion, surface damage, and rust.

.2 After arrival on site, remove wet wrapping materials, inspect doors and frames for damage, and notify delivery company and supplier if damage is found.

.3 Minor damage may be repaired if refinished products match new work, and are acceptable to Consultant.

.3 Storage and Handling Requirements:

.1 Store materials off ground, in a dry, well-ventilated indoor location, in a manner that prevents sagging, bowing, or twisting, and in accordance with manufacturer's recommendations, and CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.

.2 Store with space between stacked doors to allow air circulation.

.3 Store and protect steel doors and frames from nicks, scratches, and distortion.

1.8 SITE CONDITIONS

.1 Site Measurements: Before fabrication, verify actual dimensions of openings by measuring on site, and indicate actual measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

.2 Established Dimensions: When site measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating doors and frames without site measurements. Coordinate site construction to ensure that actual site dimensions correspond to established dimensions.

1.9 WARRANTY

.1 Manufacturer's Warranty: Submit manufacturer's standard warranty.

Part 2 Products

2.1 REGULATORY REQUIREMENTS

.1 Steel Fire-Protection Rated Doors, Frames, and Screens: Labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN/ULC-S104 and CAN/ULC-S105 for ratings indicated.

.2 Affix appropriate label to each opening indicating the labelling requirement, as follows:

.1 At standard size openings: Fire endurance rating .

.2 At oversized openings: Unclassified as to fire rating .

2.2 PERFORMANCE REQUIREMENTS

.1 Design exterior frame assembly to accommodate expansion and contraction when subjected to a minimum and maximum surface temperature of -35 °C to 35 °C.

.2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

.3 Steel Fire-Rated Doors and Frames: Labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN/ULC-S104 or NFPA 252 for ratings specified or indicated.

.4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN/ULC-S104 or NFPA 252 and listed by a nationally recognized agency having factory inspection services.

.5 Provide lab-tested door and frame assemblies with acoustic performance and a minimum Sound Transmission Class (STC) 52 tested to ASTM E90.

2.3 MATERIALS

.1 Interior Doors and Frames: Metallic coated steel sheets in accordance with ASTM A924/A924M, coated to ASTM A653/A653M, Commercial Steel (CS), Type B, ZF75 galvannealed, stretcher levelled standard of flatness where used for face sheets.

.2 Metallic Coated Steel Sheet Thickness: Minimum thickness in accordance with CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products, Table 1 and Appendix 1.

.3 Reinforcement Channels: To CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/653M, ZF75.

2.4 DOOR CORE MATERIALS

.1 Honeycomb: Structural small cell, maximum 25 -mm kraft paper, minimum 36 kg weight per ream, minimum 16.5 kg/m ^{3} density, and sanded to required thickness.

2.5 ADHESIVES

.1 Honeycomb Core and Steel Component Adhesive: Heat resistant, spray grade, polyurethane.

.2 Lock-Seam Edge Adhesive: Fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

2.6 ACCESSORIES

.1 Touch-up Primer: To CAN/CGSB-1.181

.2 Isolation Coating: Alkali-resistant bituminous paint

.3 Interior Top Caps: Steel

.4 Door Silencers/Bumpers: Single stud neoprene type, grey colour. Self-adhesive type silencers are not acceptable.

.5 Metallic Paste Filler: To manufacturer's standard.
.6 Fire Labels: Metal riveted.
.7 Site-Applied Sealant at Frame Perimeter: paintable type, as indicated in Section 07 92 00 - Joint Sealants.
.8 Glazing Stops: Formed steel having 1.0 mm metal core thickness, screw attached. Accurately fit and butt at corners, glazing trim and stops, locate on secure side of door or facing interior of room.
.9 Glazing: type, as indicated in Section 08 80 00 - Glazing.
.10 Floor Anchors and Channel Spreaders: 1.60-mm nominal tee anchors, 1.19-mm wall stud anchors, and provide anchors appropriate to site conditions, as follows:
    .1 Interior Locations: Wipe coat galvanized
    .2 Drilled stud anchors for wire tie to studs

2.7 FABRICATION - FRAMES

.1 Fabricate frames in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames.
.2 Fabricate frames to profiles and maximum face sizes as indicated.
.3 Interior Frames: 1.6 mm welded type construction.
    .1 Provide minimum 16 -mm stop height for factory-sealed double-glazed units.
.4 Blank, reinforce, drill, and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface-mounted hardware.
.5 Protect mortised cut-outs with steel guard boxes.
.6 Reinforce frames for surface-mounted hardware.
.7 Prepare door openings for door silencers:
    .1 Three silencers on strike jamb for single door openings.
    .2 Two silencers on heads for double door openings.
.8 Manufacturer's nameplates on frames and screens are not permitted.
.9 Conceal fastenings except where exposed fastenings are indicated.
.10 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
.11 Provide fire labelled frame products for openings requiring fire protection ratings, as scheduled. Test products in conformance with CAN/ULC-S104, CAN/ULC-S106 and NFPA 252 and list by a nationally recognized agency having factory inspection services and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

2.8 FRAME ANCHORAGE

.1 Provide concealed anchorage to floor and wall construction.
.2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
.3 Provide 2 anchors for rebate opening heights up to 1520 mm, and one additional anchor for each additional 760 mm of height or fraction thereof.
.4 Locate anchors for frames in previously placed concrete, masonry or structural steel a maximum 150 mm from top and bottom of each jamb and intermediate anchors at a maximum 660 mm on centre.

2.9 FRAMES - WELDED TYPE

.1 Perform welding to CSA W59.
.2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
.3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails, and sills.
.4 Grind welded joints and corners to flat plane, fill with metallic paste, and sand to uniform smooth finish.
.5 Securely attach floor anchors to inside of each jamb profile.
.6 Weld in two temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.10 FABRICATION - GLAZING STOPS FOR DOORS AND FRAMES

.1 Make provisions for glazing as indicated and provide necessary glazing stops.
.2 Fabricate glazing stops as a formed channel that is a minimum 16 mm high, accurately fitted, butted at corners and fastened to frame sections with countersunk oval head screws.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel doors and frames installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INSTALLATION - GENERAL

.1 Install doors and frames to CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames.
.2 Install fire-rated doors and frames in accordance with NFPA 80.

3.3 INSTALLATION - FRAMES

.1 Set frames plumb, square, level, and at correct elevation.
.2 Secure anchorages and connections to adjacent construction.
.3 Brace frames rigidly in position until built-in:
  .1 Remove temporary jamb spreaders.
  .2 Provide temporary wood spreaders at third points of frame rebate height to maintain frame width until adjacent building-in work completed.
  .3 Provide vertical support at centre of head for openings exceeding 1200 mm in width.
  .4 Remove wood spreaders after frames have been built-in.
.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
.5 Fill rough opening with low pressure spray-applied polyurethane foam to AAMA 812.
.6 Apply sealant at perimeter of frames between frame and adjacent material.
.7 Install door silencers.

3.4 INSTALLATION - DOOR HARDWARE

.1 Install hardware in accordance with manufacturer's instructions and Section 08 71 00 - Door Hardware, using manufacturer's door hardware templates.

3.5 INSTALLATION - GLAZING

.1 Install glazing in doors and frames in accordance with Section 08 80 00 - Glazing.

3.6 SITE QUALITY CONTROL

.1 Tolerances: Provide even margins between doors and jambs, and doors and finished floor and thresholds as follows.
- .1 Hinge Side: 1.0 mm
- .2 Latch Side and Head: 1.5 mm
- .3 Finished floor and thresholds: Maximum 19 mm

3.7 ADJUSTING

.1 Use primer to touch-up finishes damaged during installation.
.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to uniform, smooth finish.
.3 Repair damage to zinc coatings in accordance with ASTM A780/A780M.
.4 Repair damage to adjacent materials caused by metal doors and frames installation.
.5 Adjust operable parts for correct function.

3.8 CLEANING

.1 Progress Cleaning: Perform in as follows:
- .1 Remove traces of primer, sealants, epoxy, and filler materials. Clean doors and frames.
- .2 Clean glass and glazing materials with approved non-abrasive cleaner.

3.9 PROTECTION

.1 Protect installed products and components from damage during construction. Install temporary protective covering to exposed components.
.2 Protect thresholds, hardware, frames, doors, and glass from damage. Lock operative door bottom in up position.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants
.2 Section 08 71 00 - Door Hardware
.3 Section 08 80 00 - Glazing

1.2 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI):
  .1 ANSI H35.1/H35.1M- 2017 , American National Standard Alloy and Temper Designation Systems for Aluminum
.2 ASTM International (ASTM):
  .1 ASTM B209/B209M- 21 , Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
  .2 ASTM B221- 20 , Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
  .3 ASTM B308/B308M- 20 , Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
  .4 ASTM B429/B429M- 20 , Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
  .5 ASTM C834- 10 , Standard Specification for Latex Sealants
  .6 ASTM C920- 14 , Standard Specification for Elastomeric Joint Sealants
  .7 ASTM C1193- 13 , Standard Guide for Use of Joint Sealants
  .8 ASTM C1330- 02 , Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
  .9 ASTM E283- 04 , Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  .10 ASTM E330/E330M- 02 , Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .11 ASTM E331- 00 , Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  .12 ASTM E547- 00 , Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference
  .13 ASTM E779- 19 , Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
  .14 ASTM E783- 02 , Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
  .15 ASTM E1105- 00 , Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
  .16 ASTM E1300- 12ae1 , Standard Practice for Determining Load Resistance of Glass in Buildings

.3 Builders Hardware Manufacturer's Association (BHMA):
- .1 ANSI/BHMA A156.1- 2021 , Standard for Butts and Hinges
- .2 ANSI/BHMA A156.3- 2020 , Standard for Exit Devices
- .3 ANSI/BHMA A156.4- 2019 , Standard for Door Controls - Closers
- .4 ANSI/BHMA A156.5- 2020 , Standard for Cylinders and Input Devices for Locks
- .5 ANSI/BHMA A156.6- 2015 , American National Standard for Architectural Door Trim
- .6 ANSI/BHMA A156.8- 2021 , Standard for Door Controls - Overhead Stops and Holders
- .7 ANSI/BHMA A156.13- 2017 , American National Standard for Mortise Locks and Latches, Series 1000
- .8 ANSI/BHMA A156.16- 2018 , Standard for Auxiliary Hardware
- .9 ANSI/BHMA A156.18- 2020 , Standard for Materials and Finishes
- .10 ANSI/BHMA A156.21- 2019 , Standard for Thresholds
- .11 ANSI/BHMA A156.22- 2017 , American National Standard for Door Gasketing and Edge Seal Systems
- .12 ANSI/BHMA A156.26- 2017 , Standard for Continuous Hinges

.4 Canadian General Standards Board (CGSB):
- .1 CAN/CGSB-12.1- 2017 , Safety Glazing
- .2 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings

.5 CSA Group (CSA):
- .1 AAMA/WDMA/CSA 101/I.S.2/A440- 11 , NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights
- .2 CSA A440S1- 17 , Canadian Supplement to AAMA/WDMA/CSA A101/I.S.2/A440- 11 , NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights
- .3 CSA A440.2- 14 , Fenestration Energy Performance
- .4 CAN/CSA A440.4- 07 , Window, Door and Skylight Installation
- .5 CSA G40.20/G40.21- 13 , General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
- .6 CSA G164- 18 , Hot Dip Galvanizing of Irregularly Shaped Articles

.6 Fenestration & Glazing Industry Alliance (FGIA) (formerly American Architectural Manufacturers Association (AAMA)):
- .1 AAMA 501.2- 09 , Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
- .2 AAMA 609/610- 15 , Cleaning and Maintenance Guide for Architecturally Finished Aluminum
- .3 AAMA 611- 20 , Voluntary Specification for Anodized Architectural Aluminum
- .4 AAMA 1503- 09 , Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- .5 AAMA 2604- 21 , Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

.6 AAMA 2605- 20 , Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

.7 The Master Painters Institute (MPI):

.1 MPI Approved Products List, current edition

.8 Underwriters Laboratories (UL):

.1 UL 2761- 2011 , Sustainability for Sealants and Caulking Compounds

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: Hold meeting 1 week before beginning work of this Section and on-site installation , with Contractor, Subcontractor, and Departmental Representative DCC Representative Consultant in accordance with Section 01 31 19 - Project Meetings to

.1 verify project requirements,

.2 review installation and substrate conditions,

.3 coordinate with other Subcontractors, and

.4 review manufacturer's installation instructions and warranty requirements.

.2 Sequencing: Comply with manufacturer's recommendations for sequencing construction operations.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures .

.2 Product Data:

.1 Submit manufacturer's instructions, product literature and data sheets for doors and frames and include product characteristics, performance criteria, physical size, finishes, and limitations.

.1 Indicate exterior door and frame performance ratings to AAMA/WDMA/CSA 101/I.S.2/A440 including positive design pressure, negative design pressure, water penetration resistance test pressure, and Canadian air infiltration and exfiltration level.

.2 Submit WHMIS SDS.

.3 Shop Drawings:

.1 Indicate materials and profiles and include full-size, scaled details of components for each type of door and frame. Indicate:

.1 Interior and exterior trim.

.2 Connections with adjacent construction, including air and vapour membranes.

.3 Connections between combination units.

.4 Elevations of units.

.5 Core thicknesses of components.

.6 Type and location of exposed finishes, method of anchorage, number of anchors, supports, reinforcement, and accessories.

.7 Location of sealants.

.8 Each type of door system including location.

.9 Arrangement of reinforcing for hardware and joints.

.10 Arrangement of hardware and required clearances.

.11 Locations of manufacturer's nameplates.

.4 Samples for Initial Selection:
  .1 Submit 50 x 75 -mm samples of standard complete range of aluminum finishes for Departmental Representative DCC Representative Consultant 's initial selection.
.5 Samples for Verification:
  .1 Submit sample of each type of unit for review and acceptance.
  .2 Samples will not be returned for inclusion into work.
  .3 Submit one 300 x 300 -mm corner sample of each type door and frame.
  .4 Submit sample showing glazing detail, reinforcement, and finishes.
  .5 Frame sample to show glazing stop, door stop, jointing connection, and finishes.
.6 Manufacturer Reports: Submit manufacturer's written reports within three days of promptly after review, verifying compliance of work, as described in SITE QUALITY CONTROL in Part 3 of this Section.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.
.2 Operation and Maintenance Data: Submit maintenance data for cleaning of aluminum finishes and maintenance of operable hardware, and incorporate into manual.
.3 Warranty Documentation: Submit manufacturer's warranty documents.

1.6 QUALITY ASSURANCE

.1 Qualifications:
  .1 Manufacturer: Obtain aluminum doors and frames from a single manufacturer.
  .2 Installers: Three Five years of experience with installation of aluminum doors and frames of similar complexity and scope to that required for the Project.
  .3 Testing Agencies: Provide doors and frames under label service program of a testing agency acceptable to authorities having jurisdiction (AHJ).
.2 Certifications: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, and criteria and physical requirements.
.3 Mock-Ups: Assemble a mock-up on site in accordance with Section 01 43 00 - Quality Assurance for work of this Section indicating methods and materials.
  .1 Accepted Mock-up may not form part of the Work.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging with manufacturer's labels.
  .1 Apply a temporary protective coating to finished surfaces. Use easy to remove, residue-free coatings.
  .2 Remove coating after erection Leave protective covering in place until final cleaning of building .
.2 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in a clean, well-ventilated area to prevent sagging, bowing, or twisting.
.2 Store and protect aluminum doors and frames from nicks, scratches, and blemishes.

1.8 SITE CONDITIONS

.1 Site Measurements: Before fabrication, verify actual dimensions of openings by measuring on-site and indicate actual measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
.2 Established Dimensions: When site measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating doors and frames without site measurements. Coordinate site construction to ensure that actual site dimensions correspond to established dimensions.

1.9 WARRANTY

.1 Manufacturer's Warranty: Submit manufacturer's standard materials and fabrication warranty.

Part 2 Products

2.1 MATERIALS

.1 Aluminum Extrusions: To Aluminum Association alloy AA6063- T5 or T6 anodizing quality.
.2 Sheet and Plate Aluminum: To ASTM B209/B209M , and Aluminum Association alloy AA1100 AA5005 , anodizing quality.
.3 Extruded Bars, Rods, Profiles, and Tubes: To ASTM B221 , and ANSI H35.1/H35.1M , AA6063-T5 or T6, anodizing quality.
.4 Extruded Structural Pipe and Tubes: To ASTM B429/B429M and ANSI H35.1/H35.1M , AA6061-T6 or AA6063-T6, anodizing quality.
.5 Steel Reinforcement: To CSA G40.20/G40.21 ASTM B308/B308M , anodizing quality.

2.2 ALUMINUM DOORS

.1 Aluminum Door Type B : Seamless extruded door sections, non- thermally broken.
  .1 Acceptable manufacturers:
    .1 Falkbuilt.
    .2 Steelcase.
    .3 or approved equal.
  .2 Aluminum Wall Thickness: 41.3 mm (1-5/8")
  .3 Door Section Depth: as specified by aluminum door manufactuer.
  .4 Glazing Stops: Interlocking snap-in type for dry glazing. Tamperproof type.
  .5 Hinge: Pin hinge (3 Hinge)
    .1 Top Hinge: to be bearing.
    .2 Middle Hinge: to be hydraulic unless noted otherwise.
    .3 Bottom Hinge: to be hydraulic unless noted otherwise.
  .6 Frame: 6063-T6 Extruded aluminum
    .1 Colour and Pattern: 23000 Black
  .7 Glazing:

.1 Clear, tempered

.2 Aluminum Door: Type D: Refer to section 08 32 00 Sliding Glass Doors.

2.3 ALUMINUM FRAMES

.1 Aluminum Frame Type ALS2, ALS3, ALS4, ALS5, ALS6, ALS7 and ALS9 as indicated on Window Elevations : Non- thermally broken non-insulated frames, seamless aluminum extrusions, glazing throat to accommodate specified glazing, and as follows:

.1 Acceptable Manufacturers:

.1 Falkbuilt.

.2 Steelcase.

.3 or approved equal.

.2 Aluminum Wall Thickness: 41.3mm (1-5/8").

.3 Back Frame Profile Depth: 63.5 mm (2-1/2")

.4 Glass Mounted: Centre of frame.

2.4 DOOR HARDWARE

.1 Butts and Hinges:

.1 Ball Bearing Butt Hinges: To ANSI/BHMA A156.1 , Grade 1 , non-ferrous metal, radius corners, non-removable pins, three four hinges for each door leaf.

.2 Locking Devices:

.1 Cylinders: Refer to Section 08 71 00 - Door Hardware .

.2 Keying: Master key system as indicated by Owner

.3 Closers: To ANSI/BHMA A156.4 , Grade 1 , adjustable to suit site conditions.

.4 Overhead Stops and Holders: To ANSI/BHMA A156.8 , . .

.5 Architectural Door Trims: To ANSI/BHMA A156.6 :

.1 Door Pulls: as selected by Consultant

.2 Pull Bars: as selected by Consultant

.3 Push Bars: as selected by Consultant

.6 Door Gasketing and Edge Seals: To ANSI/BHMA A156.22 , Grade 1 :

.1 Door Bottom Seal: Operable and automatic retract mechanism when door opens adjustable , anodized extruded aluminum frame and vinyl weather seal, recessed in door bottom surface-mounted with drip cap , closed ends, aluminum finish matching door .

2.5 GLAZING MATERIALS

.1 Glass: Tempered and laminated glass to CAN/CGSB-12.1 , Type 1 2 , Class A B .

2.6 FINISHES

.1 Aluminum Finishes:

.1 Clear Anodic Finish: To AAMA 611 :

.1 Class I, minimum 0.018 mm thick , AA-M10C21A41 or AA-M45C22A41

.2 Class II, 0.010 mm thick , AA-M10C21A31

2.7 FABRICATION

.1 Fabricate doors and frames with hardware installed to maximum extent practical.

.2 Provide structural steel reinforcement as required.

.3 Fit joints tightly and secure mechanically. Reinforce mechanically-joined corners of doors to produce sturdy door unit. Fabricate framing members with straight profiles, without distortions or defects and with mitered or coped corners.

.4 Framing systems to allow condensation occurring within framing to migrate to the exterior.

.5 Conceal fastenings, except where Departmental Representative DCC Representative Consultant has accepted visible fastener locations that are unavoidable.

.6 Provide a minimum 22 -mm bite for insulating glazed units. Isolate glass and glazing from framing members.

.7 Mortise, reinforce, drill, and tap doors, frames and reinforcements to receive hardware using templates indicated in Section 08 71 00 - Door Hardware .

.8 Locate operating devices (e.g., handles, pulls, latches, and locks) mounted between 900 mm and 1100 mm from the floor.

2.8 ACCESSORIES

.1 Fasteners: Aluminum cadmium plated steel or stainless steel .

.1 Self-locking type where fasteners may be subject to loosening from thermal or structural movements, wind loads, or other vibrations.

.2 Provide slip joint construction at movement joints of materials.

.3 Where visible fasteners are unavoidable, and Departmental Representative DCC Representative Consultant has accepted specific visible fastener locations, fastener finish to match adjacent material.

.2 Anchors: 3-way adjustable type that accommodate fabrication and installation tolerances.

.3 Isolation Coating: Alkali resistant bituminous paint Epoxy resin type

.4 Sealant Systems: In accordance with Section 07 92 00 - Joint Sealants .

.1 Backing Rod: To ASTM C1330 , Type B , Type C , or Type O to site application; size and density to control sealant depth.

.2 Interior Sealants at Frame Perimeter: To ASTM C834 , Use A, acrylic type , non-sag.

.3 Sealant Colours: To match adjacent surface As selected by Consultant .

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for beginning installation of aluminum doors and frames in accordance with manufacturer's instructions.

.1 Visually inspect substrates.

.2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Set frames plumb, square, and level at correct elevation in alignment with adjacent work and without warp or racking.

.2 Anchor frames securely and rigidly.

.3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.
.4 Permanently isolate aluminum from direct contact with dissimilar metals, concrete, and masonry.
.5 Make allowances for deflection of building structure to ensure structural loads are not transmitted to frames.
.6 Glaze aluminum doors and frames in accordance with Section 08 80 00 - Glazing .
.7 Provide airtight joint sealant system inside of frames in exterior walls.
.8 Apply sealants in accordance ASTM C1193 Section 07 92 00 - Joint Sealants .
.9 Adjust door components for a smooth and quiet operation with continuous contact with door edge seals.

3.3 TOLERANCES

.1 Limit variation from true location and plane to 3 mm in 3660 mm.
.2 Limit difference between diagonal measurements to 3 mm.

3.4 SITE QUALITY CONTROL

.1 Manufacturer Services: Provide manufacturer's site services consisting of periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  .1 Have manufacturer of products of this Section review work involved in handling, installation, protection, and cleaning of its products, and submit written reports in acceptable format to verify compliance of this Section.
  .2 Schedule of Site Visits:
    .1 After delivery and storage of products, when preparatory work of this Section is complete, but before frame installation begins.
    .2 During progress of work at 25% , 50% , and 75% completion.
    .3 Upon completion of work, after cleaning carried out.

3.5 CLEANING

.1 Progress Cleaning: Clean doors, frames, and glazing

  .1 Clean as soon as possible after installation to remove construction debris and dirt.
  .2 Clean aluminum with damp rag and manufacturer recommended non-abrasive cleaner.
  .3 Remove excess primer, sealants, and epoxy.
.2 Final Cleaning:
  .1 Clean glass and glazing materials with approved non-abrasive cleaner.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction. Mark glass which may be subject to accidental breakage by Subcontractors. Use temporary markings that after removal do not stain or otherwise leave a perceptible effect.
.2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Sliding doors and frames.
.2 Glazing.
.3 Operating hardware.

1.2 RELATED REQUIREMENTS

.1 Section 06 10 00 - Rough Carpentry: Framed openings; wood perimeter blocking and shims.
.2 Section 07 21 16 - Blanket Insulation: Fibrous stuffing insulation at door frame perimeter.
.3 Section 07 92 00 - Joint Sealants: Perimeter sealant and backup materials.
.4 Section 08 71 00 - Door Hardware - General: Cylinder locks.
.5 Section 08 80 00 - Glazing: Product requirements for glass units.

1.3 REFERENCE STANDARDS

.1 DAF-45OL Designation system for aluminum finishes
.2 AAMA 1503-09 Voluntary Test Method For Thermal Transmittance And Condensation Resistance Of Windows, Doors And Glazed Wall Sections
.3 STD AAMA/WDMA/CSA 101/I.S.2/A440-17 NAFS - North American fenestration standard/Specification for windows, doors, and skylights
.4 STD AAMA/WDMA/CSA 101/I.S.2/A440-17 NAFS - North American fenestration standard/Specification for windows, doors, and skylights
.5 ASTM B221M-21 Standard specification for aluminum and aluminum-alloy extruded bars, rods, wire, profiles, and tubes (metric)
.6 ASTM B221-21 Standard specification for aluminum and aluminum-alloy extruded bars, rods, wire, profiles, and tubes
.7 ASTM E283/E283M-19 Standard test method for determining rate of air leakage through exterior windows, skylights, curtain walls, and doors under specified pressure differences across the specimen
.8 ASTM E330/E330M-14 Standard test method for structural performance of exterior windows, doors, skylights and curtain walls by uniform static air pressure difference
.9 ASTM E331-00(2016) Standard test method for water penetration of exterior windows, skylights, doors, and curtain walls by uniform static air pressure difference
.10 ASTM F842-17 Standard test methods for measuring the forced entry resistance of sliding door assemblies, excluding glazing impact
.11 CAN/CGSB 12.8-2017 Insulating glass units
.12 Specifications for insect screens for windows, sliding doors, and swinging doors
.13 CSA A440.4:19 Window, door, and skylight installation
.14 IGMA (Insulating Glass Manufacturers Alliance).
.15 IGMAC (Insulating Glass Manufacturers Association of Canada) - IGMAC Certification Program for the CGSB 12.8 standard.

1.4 ACTION SUBMITTALS

.1 Product Data: Provide component dimensions, fastener types, glass, internal

.2 drainage details, cuts of hardware and accessories.

.3 Shop Drawings: Indicate opening dimensions, elevations of differing units framed opening tolerances, method for achieving air and vapour barrier seal to adjacent construction, anchorage locations, affected related work, and installation requirements.

.4 Samples:

1.5 INFORMATIONAL SUBMITTALS

.1 Certificates: Certify that Products meet or exceed specified requirements.

.2 Installation Data: Indicate special procedures and perimeter conditions requiring special attention.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 77 00 - Closeout Procedures.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.

.2 Perform Work in accordance with the following:

.1 Fabricate door assembly to AAMA/WDMA/CSA 101/I.S.2/A440.

.2 Fabricate insulated glass units to CAN/CGSB 12.8.

.3 Maintain one (1) copy of document on site.

.3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.9 SITE CONDITIONS

.1 Ambient Conditions: perform work within following limitations:

.1 Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

.2 Temperature: 15.5 degrees C, minimum, 32.2 degrees C maximum

.3 Humidity: 25 percent minimum, 55 percent maximum.

1.10 WARRANTY

.1 Section 01 78 00: Warranties.

.2 Correct defective Work within a five (5) year period after Date of Substantial Completion.

.3 Provide five (5) year manufacturer's warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

.4 Warranty: Include coverage for degradation of colour finish.

Part 2 Products

2.1 MANUFACTURERS

.1 Falkbuilt; Product: Wave Operable Walls.
.2 Other acceptable manufacturers offering functionally and aesthetically equivalent or better prodcts:
  .1 NanaWall; Product: NW Acoustical 645 Interior Aluminum Framed Folding Glass Wall for Superior Acoustic Control.
.3 Substitutions: Refer to Section 01 25 00 - Substitution Procedures.

2.2 DESCRIPTION

.1 System Description:
  .1 Operable double glazed wall solution, floor mounted (continuously hinged), with floor and ceiling track.
  .2 Sliding Doors: Extruded aluminum sections, factory fabricated, vision glass, threshold, related flashings, anchorage and attachment devices.
  .3 Aluminum glass wall framing
.2 Construction
  .1 Panel Frame & Track Construction: Aluminum
  .2 Max. Allowable Structure Deflection: 1/4” (6.35mm)
  .3 Floor Tolerance: 1/4” (6.35mm) over entire wall run
  .4 Ceiling Tolerance // Floor Mounted: 1/4” (6.35mm) over entire wall run
.3 Structural Requirements
  .1 Weight: 6.35lbm/ft² (31kg/m2)
  .2 Structural support to be provided by others
.4 Dimensional Details
  .1 Max. Panel Height
    .1 Double Glazed: 3657.6 mm (12’-0")
    .2 Solid: 4000 mm (13 1-1/2”)
  .2 Max. Opening Width:
    .1 Continuously Hinged: 12 m (39’-0")
    .2 Independent Panels: 20 m (65'-7-3/8")
  .3 Panel Thickness:
    .1 70-71 mm (2-3/4")
.5 Mounting & Operation
  .1 Floor Mounted:
    .1 Structurally supported: floor track.
    .2 Guide: Ceiling track.
      .1 19.05 mm (3/4") minimum plywood or 20ga steel stud backing required
    .3 Track to Wall connection:
      .1 Backing required behind location of each dock. Backing must run floor to ceiling.
    .4 Floor Tolerance: 6/35 mm (1/4") over entire wall run.
    .5 Ceiling Tolerance // Floor Mounted: 6.35 mm (1/4”) over entire wall run.
.6 Panel Locking:

.1 Provided by manufacturer as per manufacturer's instructions.

2.3 PERFORMANCE / DESIGN CRITERIA

.1 Conform to AAMA/WDMA/CSA 101/I.S.2/A440.
.2 Structural Performance: Stick-built partitions shall be capable of withstanding the effects of gravity loads, dead loads, and the following loads and stresses within limits and under conditions indicated:
  .1 Deflection: Lateral deflection tested under a uniformly distributed load of 5 psf (0.24 kN/m2), maximum.
    .1 Glass Walls: L/175 or 3/4 inch (19 mm) whichever is less.
.3 Surface-Burning Characteristics: Tested in accordance with ASTM E84 by a qualified independent testing agency.
.4 Acoustical Performance: Provide stick-built partitions with STC rating indicated, determined by testing to ASTM E90 and classified in accordance with ASTM E413

2.4 FRAMING SYSTEM

.1 Framing, Folding Glazed Wall System: ASTM B221 Alloy 6063-T6 Extruded aluminum, Framed and Butt-jointed.
  .1 Product: Falkbuilt Wave Operable Walls
    .1 Profile Dimensions:
      .1 79mm (3-1/8") deep x 2-13/16" wide aluminum sections
    .2 Track and Sliders: Manufacturer's standard.
    .3 Glass: 6mm (1/4"), tempered
    .4 STC Rating: 43
    .5 Finish: Anodized
      .1 Colour and Pattern: selected by consultant.
    .6 Or approved equal.

2.5 MATERIALS

.1 Framing:
  .1 Extruded Aluminum: ASTM B221, 6063-T5 alloy and temper, hollow tubular sections, non-thermally broken
.2 Glazing:
  .1 Safety Glazing Labels: Permanent certification label in visible location of SGCC or other agency acceptable to authorities having jurisdiction.
.3 Sliding Door Frames: Aluminum frame, multi door sliding wall system as shown on drawings, continuous track mounted to partition frame system.

2.6 GLASS

.1 Glass and Glazing Materials: Specified in Section 08 80 00.
.2 Insulating Glass: CAN/CGSB 12.8, sealed double pane units:
  .1 Outer Pane: Clear tempered float glass.
  .2 Inner and Middle Pane: Clear tempered float glass.
  .3 Pane Thickness: Thickness 6 mm (1/4").
  .4 Minimum Total Unit Thickness: 25 mm (1").

2.7 ACCESSORIES

.1 As per manufacturers specifications.

2.8 HARDWARE

.1 Pull Handles: Manufacturer's standard type, lockable.
.2 Sliding Panel Bottom Rollers: as specified by manufacturer, adjustable from interior.
.3 Limit Stops: Resilient rubber.
.4 Cylinder Locks: To manufacturer's standard.

2.9 FABRICATION

.1 Size and fabricate door assembly to allow for tolerances of rough framed openings, clearances, shim spacing and shims around perimeter of assemblies.
.2 Ensure joints and connections are flush, hairline, and waterproof.
.3 Form sills and stools in one piece. Slope sills for wash.
.4 Assemble insect screen frames with mesh set into frame and secured. Fit frames with adjustable roller hardware.
.5 Accurately and rigidly fit joints and corners. Match and align cladding joints for continuity of line and design.
.6 Match components to ensure continuity of line.
.7 Provide drainage to exterior for moisture entering joints and glazing spaces and condensation occurring within frame construction.
.8 Install glass in fixed and sliding units to manufacturer's standard method.

2.10 FINISHES

.1 Exterior Surfaces: Anodized, colour as specified by the consultant.
.2 Interior Surfaces: Anodized, colour as selected by the consultant.
.3 Threshold: Clear anodized.
.4 Aluminum Finishes:
  .1 Anodizing: AAMA 611 Class I or AAMA 612 with electro-deposition organic seal.
    .1 Color: Clear.
  .2 Powder Coating: Thermoset polyester; AAMA 2603 but 1.5 mil minimum dry film thickness.
    .1 Color: as specified by the consultant.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.
.2 Verify locations of concealed construction for support and anchorage.
.3 Verify that openings are plumb, level, and square.
.4 Verify that floor and ceiling surfaces are in plane.

3.2 PREPARATION

.1 Clean floor, wall, and ceiling contact surfaces.
.2 Vacuum clean carpet below sill members.

3.3 INSTALLATION

.1 General:
  .1 Comply with manufacturer’s installation instructions.
  .2 Do not cut metal components except where trimming is indicated on Shop Drawings.
  .3 Install system without gaps at joints with other construction.

.2 Framing:
- .1 Install framing plumb, accurately aligned, and free of warp or twist.
- .2 Install components with securely fastened full-contact joints.
- .3 Anchor framing system rigidly and securely to adjacent construction without damaging surfaces.
- .4 Install perimeter gaskets without gaps to provide continuous light and acoustical seals.

.3 Glazing:
- .1 Install glass panels per factory-numbered sequence.
- .2 Install glass on resilient setting blocks in glazing channels.
- .3 Install glazing gaskets with joints only at corners and to provide continuous barrier to air and sound.
- .4 Install glass panels with open vertical joints of uniform width.
- .5 Double Glazing: Clean surfaces that will be inaccessible after installation in framing.

.4 Sliding Doors:
- .1 Align track for smooth, quiet operation.
- .2 Adjust end stops for accurate closed and fully open positions.

.5 Systems Integration:
- .1 Coordinate wiring connections.

.6 Tolerances:
- .1 Plumb: 1/8 inch (3 mm) maximum deviation.
- .2 Plane: 1/8 inch (3 mm) maximum deviation in 12 feet (4 m).
- .3 Level: 1/8 inch (3 mm) maximum deviation in 12 feet (4 m) for top of sill.

3.4 ADJUSTING

.1 Adjust hardware for smooth operation.

3.5 CLEANING

.1 Remove protective material from factory finished surfaces.

.2 Remove labels and visible markings.

.3 Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

.4 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

.5 Do not use alkaline or abrasive agents.

.6 Do not scratch or mar finishes.

3.6 PROTECTION

.1 Do not permit continuing construction activities near unprotected finish surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY OF WORK

.1 This Section specifies:
- .1 glazed, thermally broken aluminum-framed storefronts and accessories.
- .2 glazed, non-thermally broken aluminum-framed glass walls and accessories.

1.2 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants.

1.3 REFERENCE STANDARDS

.1 Aluminum Association (AA)
- .1 DAF 45 [2003], Designation System For Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA).
- .1 AAMA-501-[2005], Methods of Test for Exterior Walls.
- .2 AAMA-2603-[2013], Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- .3 AAMA-2604-[2013], Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- .4 AAMA-2605-[2013], Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .5 AAMA CW-10-[2012], Care and Handling of Architectural Aluminum From Shop to Site.
- .6 AAMA CW-11-[1985], Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.
- .7 AAMA-TIR A1-[2004], Sound Control for Fenestration Products.

.3 ASTM International (ASTM).
- .1 ASTM A653 / A653M – [09a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM B209-[2010], Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 ASTM B221-[2013], Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .4 ASTM C612 – [2014], Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- .5 ASTM E283-[2012], Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .6 ASTM E331-[2009], Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.

.7 ASTM E413 – [04], Classification for Rating Sound Insulation.
.8 ASTM E1105 – [2008], Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
.9 ASTM D2240 – [2010], Standard Test Method for Rubber Property—Durometer Hardness.

.4 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-12.8-[97], Insulating Glass Units.
.2 CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.
.3 CAN/CGSB-19.13-[M87], Sealing Compound, One-Component, Elastomeric, Chemical uring.

.5 CSA International (CSA)
.1 CAN/CSA-S157-[2005], Strength Design in Aluminum.
.2 CAN/CSA-S136–[2007], North American Specification for the Design of Cold-Formed Steel Structural Members.
.3 CAN**/**CSA W59.2-[M1991(R2003)], Welded Aluminum Construction.

.6 Environmental Choice Program (ECP)
.1 CCD-45-[1995], Sealants and Caulking Compounds.

.7 Underwriter's Laboratories of Canada (ULC)
.1 CAN/ULC-S710.1 [2005], Standard for Thermal Insulation – Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.

.2 Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
.1 Coordinate Project Meetings and co-ordinate with other similar pre-installation meetings.
.2 Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
.1 Owner;
.2 Consultant;
.3 Glazing subcontractor;
.4 Manufacturer's Technical Representative.
.3 Ensure meeting agenda includes review of methods and procedures related to glazed aluminum-framed storefront installation including co-ordination with related work.
.4 Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures.

.2 Product Data: Submit product data including manufacturer's literature for glazed aluminum aluminum-framed storefront extruded members, panels, components and accessories, indicating compliance with specified requirements and material characteristics.
- .1 Submit list on aluminum-framed storefront manufacturer's letterhead of materials, components and accessories to be incorporated into Work.
- .2 Include product names, types and series numbers.
- .3 Include contact information for manufacturer and their representative for this Project.

.3 Shop Drawings: Submit drawings stamped and signed by Professional Engineer registered or licensed in Province Territory of Ontario, Canada. Include on shop drawings:
- .1 Aluminum-framed storefront panel and component dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .2 Include details of fasteners between interior and exterior extrusions ensuring no penetratrion of thermal break or thermal bridging.
- .3 Show size and location of seismic restraints. Include seismic design calculations

.4 Samples:
- .1 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections showing prefinished aluminum surface, finish, colour and texture, and including section of infill panel.
- .2 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections of insulating glass unit showing glazing materials and edge and corner details.

.5 Thermal Performance: Submit verification that Insulating Glass Units used in aluminum-framed storefront system meet RSI (R) values specified.

.6 Test Reports:
- .1 Submit test reports showing compliance with specified performance characteristics and physical properties including air infiltration, water infiltration and structural performance.

.7 Field Reports: Submit manufacturer's field reports within 3 days of manufacturer representatives site visit and inspection.

.8 Installer Qualifications:
- .1 Submit letter verifying installer's experience with work similar to work of this Section.

1.6 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Supply maintenance data for aluminum-framed storefront for incorporation into manual specified in Section 01 77 00 - Closeout Procedures.

.2 Record Documentation: In accordance with Section 01 77 00 - Closeout Procedures.
- .1 List materials used in aluminum-framed storefront work.

.2 Warranty: Submit warranty documents specified.

1.7 QUALITY ASSURANCE

.1 Mock-up: Co-ordinate mock-up of aluminum-framed storefront with Section 08 80 50 – Glazing: Insulating glass units

1.8 DELIVERY STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver glazed aluminum-framed storefront materials and components in manufacturers original packaging with identification labels intact and in sizes to suit project.

.2 Material Handling: To AAMA CW-10.

.3 Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

.1 Material storage: To AAMA CW-10.

.4 Packaging Waste Management:

.1 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling[in accordance with Waste Management Plan].

1.9 WARRANTY

.1 Project Warranty: Refer to Contract Conditions for project warranty provisions.

.2 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

.3 Warranty period: 2 years commencing on Date of Substantial Performance of Work.

.1 Insulating glass units: 10 years, on Date of Substantial Performance of Work.

Part 2 Products

2.1 MANUFACTURERS

.1 Aluminum-Framed Storefronts (thermally broken):

.1 Alumicor Limited.

.2 Kawneer.

.3 or approved equal.

.2 Aluminum-Framed glass walls (non-thermally broken):

.1 Falkbuilt.

.2 Steelcase.

.3 or approved equal.

2.2 DESCRIPTION

.1 Thermally broken, aluminum-framed double-glazed storefront constructed from prefinished aluminum extrusions.
  .1 Framing: Flush glazed framing 114.3 mm (4.5") deep x 50.8 mm (2") wide profile.
  .2 Glazing thickness: 25.4mm (1").
.2 Non-thermally broken aluminum-framed glazed walls constructed from single-prefinished aluminum extrusions with single glazed glass panes seated within aluminum header and shoe sections, including swing and sliding type doors.
  .1 Framing: 41.3 mm (1-5/8") deep x 63.5 mm (2-1/2") wide profile.
  .2 Glazing thickness: 10 mm (3/8")

2.3 DESIGN CRITERIA

.1 Design aluminum-framed storefront to AAMA CW-DG-1.
.2 Design aluminum components to CAN/CSA S157.
.3 Design and size aluminum-framed (thermally-broken) storefront to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of wall using design pressure of 0.95 kPa (20 psf) to AAMA CW 11 ASTM E330.
  .1 Design aluminum-framed storefront system for expansion and contraction caused by cycling temperature range of 95 degrees C over 12 hour period without causing detrimental effect to system components.
  .2 Thermal expansion: Ensure aluminum-framed storefront system can withstand temperature differential of 85 degrees C and is able to accommodate interior and exterior system expansion and contraction without damage to components or deterioration of seals.
  .3 Design vertical expansion joints with baffled overlaps and compressed resilient air seal laid between mullion ends.
  .4 Ensure system is designed to accommodate:
    .1 Movement within aluminum-framed storefront assembly.
    .2 Movement between system and perimeter framing components.
    .3 Dynamic loading and release of loads.
    .4 Deflection of structural support framing.
    .5 Shortening of building concrete structural columns.
    .6 Creep of concrete structural members.
    .7 Thermal resistance of vision glass areas: Minimum 25 mm insulating Thermal Glazing Unit
  .5 Limit mullion deflection to flexure limit of glass 19 mm (0.75") [L/175] [L/200] [L/240] maximum with full recovery of glazing materials.
  .6 Sound attenuation through wall system (exterior to interior): STC 33 to ASTM E413.
  .7 Glass dimensions: Size glass units to CAN/CGSB-12.20.
  .8 Flatness criteria: 6 mm (0.25") maximum in 6 m (20 feet) for each panel.
  .9 Air infiltration: 0.3 L/s/m^2 (0.63 cfm) maximum of wall area to ASTM E283 at differential pressure across assembly of 300 Pa (0.044 psi).
  .10 Water infiltration: None to ASTM E331 at differential pressure across assembly of 720 Pa (0.104 psi).
  .11 Ensure interior surfaces have no condensation before exposed edges of sealed units reach dew point temperatures during testing to AAMA 501.

.12 Maintain continuous air barrier and vapour retarder throughout building envelope and aluminum-framed storefront assembly.

.13 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

.14 Reinforce aluminum-framed storefront system where necessary.

.4 Design aluminum-framed glass walls (non-thermally broken) to the following:

.1 Factory fabricated, site installed partitions, including:

.1 Aluminum glass wall framing

.2 Stick-built partitions shall be capable of withstanding the effects of gravity loads, dead loads, and the following loads and stresses within limits and under conditions indicated:

.1 Deflection: Lateral deflection tested under a uniformly distributed load of 5 psf (0.24 kN/m2), maximum.

.1 Glass Walls: L/175 or 3/4 inch (19 mm) whichever is less.

.3 Surface-Burning Characteristics: Tested in accordance with ASTM E84 by a qualified independent testing agency.

.4 Acoustical Performance: Provide stick-built partitions with STC rating indicated, determined by testing to ASTM E90 and classified in accordance with ASTM E413.

.5 Framing, Fixed Glazed Wall System: ASTM B221 Alloy 6063-T6 Extruded aluminum, Framed and Butt-jointed.

.1 Product:

.1 Falkbuilt Kai adjustable glass wall system

.2 or approved equal

.2 Finish: Powder coat 23000 Black.

.6 Leveler System: Manufacturer's standard screw adjusted leveling system

.1 Base Adjustability Range: Plus or minus 1/2 inch (13 mm).

.2 Head Adjustability Range: Plus or minus 1 inch (25 mm).

.7 Safety Glazing Labels: Permanent certification label in visible location of SGCC or other agency acceptable to authorities having jurisdiction.

.8 Base Glass:

.1 Clear Glass: ASTM C1036, Type I, Class 1, Quality-Q3.

.2 Heat-Strengthened Glass: ASTM C1048, Type 1, Class 1, Quality Q3:

.1 Tempered Glass: Kind FT.

.9 Doors and Frames: Swinging Doors, reference section 08 11 16 Aluminum Doors and Frames.

2.4 ALUMINUM-FRAMED STOREFRONT SYSTEM FABRICATION

.1 Do aluminum welding to CAN/CSA W59.2.

.2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.

.1 Ensure verticals and horizontals are extrusions designed for shear block or screw spline corner construction.

.3 Construct units square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.

.4 Fabricate aluminum-framed storefront with minimum clearances and shim spacing around panel perimeter and ensure installation and dynamic movement of perimeter seal is enabled.

.5 Fabricate aluminum framed doors in accordance with Section 08 11 16 – Aluminum Doors and Frames.

.6 Accurately fit and secure joints and corners.

.1 Ensure joints are flush, hairline, and weatherproof.

.7 Prepare aluminum-framed storefront to receive anchor devices.

.8 Use only stainless steel or zinc plated concealed fasteners

.1 Ensure fasteners do not penetrate thermal break.

.2 Where fasteners cannot be concealed, countersunk screws finished to match adjacent material may be used upon receipt of written approval from Consultant.

.9 Prepare components to receive doors and openings as indicated.

.10 Reinforce framing members for exterior imposed loads where required.

.11 Visible manufacturer's labels are not permitted.

2.5 PRODUCT SUBSTITUTIONS

.1 Substitutions: In accordance with Section 01 25 00 - Substitution Procedures.

.2 Ensure components come from one manufacturer.

Part 3 Execution

3.1 INSTALLERS

.1 Use only installers with 2 years minimum experience in work similar to this Section.

3.2 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for aluminum-framed storefront installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.3 INSTALLATION

.1 Install thermally broken aluminum-framed storefront in accordance with manufacturer's written recommendations.

.2 Do aluminum welding to CAN/CSA W59.2.

.3 Attach thermally broken aluminum-framed storefront assemblies to structure plumb and level, free from warp, and allow for sufficient adjustment to accommodate construction tolerances and other irregularities.

.1 Maintain dimensional tolerances and align with adjacent work.

.2 Use alignment attachments and shims to permanently fasten elements to building structure.
.3 Clean welded surfaces and apply protective primer to field welds and adjacent surfaces.

.4 Install thermal isolation where components penetrate or disrupt building insulation.
.5 Install sill flashings.
.6 Install smoke sealing where indicated.

.7 Install liquid foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
.8 Install insulating glass units in accordance with Section 08 80 50 - Glazing and to manufacturer's written instructions.
.9 Install perimeter sealant to method required to achieve performance criteria, backing materials, and installation criteria in accordance with Section 07 92 00 - Joint Sealants.

3.4 FIELD QUALITY CONTROL

.2 Site Installation Tolerances:
.1 Variation from plumb: 12 mm per 30 m (0.5 inches per 100 feet) maximum.
.2 Misalignment of two adjacent panels or members: 0.8 mm (0.03 inches) maximum.
.3 Sealant space between aluminum-framed storefront and adjacent construction: 13 mm (0.5 inches) maximum.

.3 Manufacturer's Services:
.1 Coordinate manufacturer's services
.1 Submit to Consultant a written agreement from the manufacturer to perform the manufacturer's services.
.2 Schedule manufacturer's review of work procedures at stages listed:
.3 Product Application: 1 off site reviews.

.2 Submit manufacturer's written reports to Consultant describing:
.1 The scope of work requested.
.3 Date, time and location.
.4 Procedures performed.
.5 Observed or detected non-compliances or inconsistencies with manufacturers' recommended instructions.
.6 Limitations or disclaimers regarding the procedures performed.
.7 Obtain reports within seven days of review and submit immediately to Consultant.

3.5 CLEANING

.1 Progress Cleaning:

.1 Leave work area clean end of each day.

.2 Final leaning: Upon completion, remove surplus materials, rubbish, tools, and equipment

.3 Waste Management:

.1 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.

.2 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by aluminum-framed storefront installation.

END OF SECTION

Door Hardware

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 11 13 - Hollow Metal Doors and Frames
.2 Section 08 11 16 - Aluminum Doors and Frames

1.2 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA):
  .1 ANSI/BHMA A156.1- 2016, Butts and Hinges
  .2 ANSI/BHMA A156.2- 2017, Bored and Preassembled Locks and Latches
  .3 ANSI/BHMA A156.3- 2020, Exit Devices
  .4 ANSI/BHMA A156.4- 2019, Door Controls - Closers
  .5 ANSI/BHMA A156.5- 2020, Cylinders and Input Devices for Locks
  .6 ANSI/BHMA A156.6- 2015, Architectural Door Trim
  .7 ANSI/BHMA A156.8- 2015, Door Controls - Overhead Stops and Holders
  .8 ANSI/BHMA A156.10- 2017, Power Operated Pedestrian Doors
  .9 ANSI/BHMA A156.12- 2018, Interconnected Locks
  .10 ANSI/BHMA A156.13- 2017, Mortise Locks and Latches
  .11 ANSI/BHMA A156.14- 2019, Sliding and Folding Door Hardware
  .12 ANSI/BHMA A156.15- 2015, Release Devices - Closer Holder, Electromagnetic and Electromechanical
  .13 ANSI/BHMA A156.16- 2018, Auxiliary Hardware
  .14 ANSI/BHMA A156.17- 2019, Self Closing Hinges and Pivots
  .15 ANSI/BHMA A156.18- 2020, Materials and Finishes
  .16 ANSI/BHMA A156.19- 2019, Power Assist and Low Energy Power Operated Doors
  .17 ANSI/BHMA A156.20- 2021, Strap and Tee Hinges and Hasps
  .18 ANSI/BHMA A156.21- 2019, Thresholds
  .19 ANSI/BHMA A156.22- 2021, Gasketing
  .20 ANSI/BHMA A156.26- 2021, Continuous Hinges
  .21 ANSI/BHMA A156.28- 2018, Recommended Practices for Mechanical Keying Systems
  .22 ANSI/BHMA A156.29- 2017, Exit Locks, Exit Alarms, Alarms for Exit Devices
  .23 ANSI/BHMA A156.30- 2020, High Security Cylinders
  .24 ANSI/BHMA A156.34- 2019, Bored Locks and Mortise Locks with Ligature Resistant Trim
  .25 ANSI/BHMA A156.36- 2020, Auxiliary Locks
.2 Canadian Steel Door Manufacturers' Association (CSDMA):
  .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
.3 CSA Group (CSA):
  .1 CSA B651- 18, Accessible Design for the Built Environment
.4 Door and Hardware Institute (DHI):
  .1 Sequence and Format for the Hardware Schedule, 2019
.5 National Fire Protection Association (NFPA):

.1 NFPA 80- 2013, Standard for Fire Doors and Other Opening Protectives

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Coordinate with shop drawings or other Sections. Confirm that adequate previsions are made for locating and installing door hardware in accordance with indicated requirements, and as follows:

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer's product data for each type of door hardware. Include product characteristics, performance criteria, profiles, dimensions, finishes, and limitations.

.2 Samples:
- .1 Submit samples of the following hardware items for verification:
  - .1 cylinders, door gaskets, door sweeps, locks and latches.
- .2 Identify each sample with a label indicating applicable specification paragraph number, brand name, model number, finish, and hardware schedule group/number.
- .3 After approval, samples will not be returned for inclusion into Work.

.3 Source Quality Control Submittals: When requested, submit proof of door hardware schedule consultant's participation in Door and Hardware Institute ｢ (DHI) Continuing Education Program.

.4 Contract Door Hardware Schedule: Submit schedule prepared by or under the supervision of a qualified hardware consultant detailing fabrication and assembly of door hardware.
- .1 Comply with DHI Sequence and Format for the Hardware Schedule.
- .2 Organize the door hardware schedule into door hardware groups indicating a complete description of every item required for each door (or opening).
- .3 Indicate hardware make, model, material, function, handing, size, fastening, and finish using codes in BHMA A156.18, and other pertinent information.
- .4 Include keying schedule describing how each locking device is keyed in accordance with ANSI/BHMA A156.28. Index each key type to a specific door number.
- .5 Indicate location of each door hardware set, cross-referencing door numbers indicated in the Contract Documents.
- .6 Include an explanation of abbreviations, symbols, and alphanumeric codes in contract hardware schedule, where applicable.
- .7 Include DHI certification stamp on contract door hardware schedule.

.5 Test Reports: When requested, submit certified test reports showing a product's compliance to a specified referenced standard.

.6 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance data for door hardware and incorporate into manual.

.3 Warranty Documentation: Submit manufacturer's material and fabrication warranty.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials: Supply maintenance materials in accordance with Section Section 01 78 00 - Closeout Submittals.

1.7 QUALITY ASSURANCE

.1 Qualifications:
- .1 Door Hardware Consultant: DHI-certified, including any of the following: Door + Hardware Consultant (DHC), Door + Hardware Specification Consultant (DHSC), or Access Control System Consultant (ACSC) , or an Architectural Hardware Consultant.
- .2 Installer: Completed door hardware projects similar in scope to this Project with a record of successful in-service performance in the past five years.

.2 Regulatory Requirements:

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging and with manufacturer's labels.

.2 Package hardware items, including fasteners, separately or in groups of related hardware. Protect prefinished surfaces with wrapping, strippable coating, or other protective packaging. Label each package with their contents and location in building.

.3 Storage and Handling Requirements:
- .1 Store materials off ground in a dry, well-ventilated indoor location, and in accordance with manufacturer's recommendations.
- .2 Store and protect door hardware from scratches and other damages.

Part 2 Products

2.1 DOOR HARDWARE

.1 Use products from only one manufacturer for similar items.

.2 Refer to the attached Finished Door Hardware Schedule for door hardware requirements.

2.2 FASTENINGS

.1 Use only fasteners provided by the manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Match exposed fastening devices to finish of hardware.

.4 Where pull is positioned on one side of the door and push plate on the other side, supply fastening devices, and install to secure pull through the door from the reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with the material they are used in.

2.3 KEYING

.1 Doors, padlocks and cabinet locks to be master keyed. Prepare detailed keying schedule in conjunction with Consultant and Departmental Representative.

.2 Provide keys in duplicates for every lock of the Work.

.3 Provide 3 master keys for each master key or grand master key group.
.4 Stamp keying code numbers on keys and cylinders.
.5 Provide construction cores.
.6 Provide permanent cores and deliver keys to Departmental Representative.

Part 3 Execution

3.1 INSTALLATION

.1 Manufacturer's Instructions: Comply with manufacturer's recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
.2 Provide metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
.3 Provide manufacturers' instructions for proper installation of each hardware component.
.4 Install hardware to standard hardware location dimensions in accordance with CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames and CSA B651.
.5 Where door stop comes into contact with door pull, mount stop to strike bottom of pull.
.6 Use only manufacturer's supplied fasteners.
    .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
.7 Remove construction cores when directed by Owner.
    .1 Install permanent cores and confirm locks operate correctly.

3.2 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
.2 Lubricate hardware, operating equipment and other moving parts.
.3 Adjust door hardware to ensure tight fit at contact points with frames.

3.3 CLEANING

.1 Progress Cleaning:
    .1 Remove protective coatings and wrappings from hardware items.
    .2 Final Cleaning

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

END OF SECTION

Finish Hardware Schedule
Sherwood Library Renovation
1225 Wonderland Rd. North
London, Ont.

Architect:	**Matter Achitectural Studio** **300-1108 Dundas St.** **London, Ont.** **P: 519-601-6274**
Contractor:	
Schedule by:	**Southwest Doors & Hardware (1995) Ltd.,** **3851 Commerce Rd.** **London Ontario N6N 1P9** **Tel: (519) 681-3142** **Fax: (519) 644-2704**
Consultant:	**Brandon Shepherd**
Written By:	**Brandon Shepherd**
Date:	**July 10 / 2024**
Revised:	**July 22 / 2024**
Revised:	**July 24 / 2024**
Revised:	**August 9 / 2024**
Revised:	**August 14 / 2024**
Revised:	**August 20 / 2024**

PART 1 - GENERAL

1.1 General Requirements

.1 This section shall be governed by the General requirements in Divison 1 of the Architectural Specifications for this project.
.2 Supply and installation of finish hardware as per hardware schedule and as detailed herein.

1.2 Related Sections

.1 Hollow Metal doors and Frames - Section 08110
.2 Wood Doors – Section 08210
.3 Aluminum Doors and Frames - Section 08400
.4 Glass and Glazing – Section 08800
.5 Finished Carpentry – Section 06200
.6 Electrical Boxes, conduit, wire runs and 115VAC hook up for electrical hardware and security - Division 16

1.3 Allowances

.1 No allowances are required for this project.

1.4 References

.1 NFPA 80 Standards for fire doors and windows.
.2 National building code of Canada 1995.
.3 DHI Recommended locations for architectural hardware for custom steel doors and frames.

1.5 Submittals

.1 All submittals shall be in accordance with section 01300.

1.6 Schedules

.1 Submit 1 copy of the detailed hardware schedule. Schedule shall have heading information for each set as well as detailed operational descriptions for any headings with electrified hardware.

1.7 Product Data

.1 Submit 1 copy of catalog cut sheets for all major hardware items listed in this hardware schedule.

1.8 Samples

.1 Submit product samples as requested by the Architect. Mark samples with project name and location. Samples shall be incorporated into the project after the Architect's approval.

1.9 Templates

.1 Templates and approved schedules shall be sent to the related sections who must prepare products that receive finish hardware as outlined in article 1.2 related sections.

1.10 Keying Schedule

.1 Submit 1 copy of a preliminary keying schedule. Hardware supplier to meet with the owner or owners' representative to finalize the keying requirements.

1.11 Wiring Diagrams

.1 Submit 1 copy of riser and point to point diagrams for all electrified hardware. Coordinate with Division 16.

1.12 Operations And Maintance Manuals

.1 Submit 1 copy of maintance manuals containing the following and as outlined in Division 1.

.1 Maintence instructions for each item of hardware.
.2 Catalog cuts for each item of hardware.
.3 Parts list for each major item of hardware.
.4 Approved hardware schedule.
.5 Approved keying schedule.
.6 Name and address of hardware supplier.

1.13 Quality Assurance

.1 Hardware supplier to have at least one architectural hardware consultant, or a person of equal experience on staff.
.2 Hardware installer shall have a minimum 3 years experience with installing finish hardware of the type to be used on this project.

1.14 Delivery, Storage And Handling

.1 Hardware shall be delivered to site in original manufactures packaging and marked with corresponding door numbers from the approved hardware schedule.
.2 Hardware shall be delivered to the jobsite and received by an employee of the General Contractor and the hardware supplier.
.3 Store hardware in a secure room with shelving. No hardware shall be stored on the floor.

1.15 Warranty

.1 Provide a warranty as stipulated in the General Requirements from the date of final completion and acceptance of work.

PART 2 - PRODUCTS

2.1 Manufactures

.1 Listed below are the manufactures and products that are specified in this schedule.

Product	Specified	Alternative
Hinges	McKinney	
Exit Devices	Sargent	
Locksets	Sargent	
Door Pulls	Standard Metal	
Push Plates	Standard Metal	
Door Closers	Sargent	
Kickplates	Standard Metal	
Stops	Standard Metal	
Overhead Stops	Sargent	
Thresholds	KN Crowder	
Weatherstrip	KN Crowder	

2.2 Finishes

.1 Finishes used in preparing this hardware schedule.

626	Brass, Bronze - Satin Chrome Plated
627	Aluminum - Clear Coated
628	Aluminum - Clear Anodized
630	Stainless Steel - Satin Stainless Steel
652	Steel - Satin Chrome Plated
689	Aluminum - Painted
600	Steel - Primed For Painting

2.3 Keying

.1 Keying to be determined at a later date with owner. All keys to be visually stamped. Supply 2 keys per cylinder. Supply 4 master keys.

PART 3 - EXECUTION

3.1 Examination

.1 Before supplying any materials, check all contract documents, shop drawings, details and field dimensions and conditions to ensure that the hardware listed is suitable for intended use. Inform consultant of any inaccuracies or discrepancies in writing.

3.2 Installation

.1 Provide instructions and templates to fabricators and to hardware installers.
.2 Where pull is scheduled on one side of door and push plate on the other side, countersink the door face and thru bolt the pull so that the push plate can cover the thru bolts from pull.
.3 Where door stop contacts pull, mount stop to strike bottom of pull.
.4 All hardware to be adjusted for proper closing and latching.
.5 Adjust door closers for proper latching at initial installation and again after the buildings HVAC system is finalized.
.6 The degree of opening listed for each door is only a guideline based on the architectural drawings. Set each door to the maximum degree of opening allowable by site conditions.
.7 All hardware to be installed by a skilled tradesman to the manufacture's installation instructions at the following mounting heights unless noted otherwise.

Latchsets	1024mm to center of strike
Deadlocks	1227mm to center of strike
Exit Devices	984mm to center of strike
Door Pulls	1015mm to center
Wall Stops	To meet bottom of pull

All hardware locations are from finished floor to centerline of strike unless otherwise noted.

HARDWARE SCHEDULE
Sherwood Library Renovation
London, Ont.

Heading #1

1 Single Door	D101A	Library 101 To Study Room 101A	RH
1 Single Door	D101B	Library 101 To Study Room 101B	LH
1 Single Door	D101C	Library 101 To Study Room 101C	LH
1 Single Door	D101D	Library 101 To Games Room 101D	LH
1 Single Door	D122A	Library 101 To Multi-Purpose Room 122	RH

Type B — 3'-4" x 7'-0" Glass Door / Aluminum Frame

All Hardware By Glass Door Supplier

Heading #2

1 Single Door	D109-EX	Reception / Admin. 108 To Librarian 109	LH
1 Single Door	D110-EX	Reception / Admin. 108 To Supervisor 110	RH
1 Single Door	D122B-EX	Multi-Purpose Room 122 From Ex. Electrical	LHR
1 Single Door	D124B-EX	Storage/Catering Prep 124 Tp Ex. Shipping/Receiving	RH
1 Single Door	D127A-EX	Corridor 127 To Ex. Women's Washroom	RH
1 Single Door	D127B-EX	Corridor 127 From Ex. Family Washroom	RHR
1 Single Door	D127C-EX	Corridor 127 To Ex. Men's Washroom	LH
1 Single Door	D127D-EX	Corridor 127 To Ex. Meeting Room	RH
1 Single Door	D127E-EX	Corridor 127 To Ex. Meeting Room	LH
1 Single Door	D127F-EX	Corridor 127 To IT Closet 127F	LH
1 Single Door	D127H-EX	Corridor 127 To Ex. Janitor	RH
1 Single Door	D127I-EX	Corridor 127 To Ex. Staff	LH

Type EX — Existing Door / Existing Frame

Existing Door / Frame / Hardware To Remain

Heading #3

1 Single Door	D101E-EX	Exterior From Library 101	RHR

Type A — Existing Door / Existing Frame

Existing Door / Frame / Hardware To Remain

HARDWARE SCHEDULE
Sherwood Library Renovation
London, Ont.

Heading #4

1 Set of Doors	D101F	Ex. Corridor 100 Tp Lobby Area 128	Sliding Doors
1 Set of Doors	D101G	Ex. Corridor 100 Tp Lobby Area 128	Sliding Doors

Type	D	Falkbuilt Wave Operable Moving Wall System

All Hardware By Door Supplier

Heading #5

1 Single Door	D102	Library 101 To Return 102	RH

Type	A	3'-4" x 6'-8" x 1-3/4" HMD / HMF	3/4 HR
3	Hinges	T4A3786 5" x 4"	626
1	Storeroom Lockset	LC-8204 LNL x RH	630
1	Mortise Cylinder	TBD - Confirm Keying Requirements	630
1	Door Closer	1431 RUO	EN
1	Armour Plate	K10A 36" x 38-1/2" x Tape	630
1	Mop Plate	K10A 12" x 39" x Tape	630
1	Wall Stop	S120	626

Heading #6

1 Single Door	D107	Reception/Admin. 108 To Ex. Storage 107	RH

Type	A	3'-4" x 6'-8" x 1-3/4" HMD / HMF	3/4 HR
3	Hinges	T4A3786 5" x 4"	626
1	Storeroom Lockset	LC-8204 LNL x RH	630
1	Mortise Cylinder	TBD - Confirm Keying Requirements	630
1	Door Closer	1431 RUO	EN
1	Armour Plate	K10A 36" x 38-1/2" x Tape	630
1	Mop Plate	K10A 12" x 39" x Tape	630
1	Wall Stop	S120	626

HARDWARE SCHEDULE
Sherwood Library Renovation
London, Ont.

Heading #7

1 Single Door		D108	Ex. Corridor 100 From Rcept. / Admin. 108	LHR
Type	A		3'-4" x 7'-0" x 1-3/4" HMD / HMF	3/4 HR
1	Mortar Box		MB - Electric Strike	
1	Mortar Box		MB - Door Contact	
3	Hinges		T4A3786 5" x 4"	626
1	Storeroom Lockset		LC-8204 LNL x LHR	630
1	Mortise Cylinder		TBD - Confirm Keying Requirements	630
1	Electric Strike		1006-CLB x 24VDC	630
1	Door Closer		1431 PS	EN
1	Kick Plate		K10A 12" x 38-1/2" x Tape	630
1	Mop Plate		K10A 12" x 39" x Tape	630
1	Card Reader		By Security Provider	
1	Door Contact		By Security Provider	

Door Closer Has Stop - Template To Max. Degree Allowable Per Site Conditions

Heading #8

1 Single Door		D108A	Library 101 To Reception / Admin. 108	LH
Type	B		3'-4" x 8'-0" Glass Door / Aluminum Frame	

All Hardware By Glass Door Supplier

Heading #9

1 Single Door		D118	Library 101 To Nursing Lounge 118	RH
Type	A		3'-4" x 6'-8" x 1-3/4" HMD / HMF	
3	Hinges		T4A3786 5" x 4"	626
1	Privacy Set		V21-8265 LNL x RH	630
1	Kick Plate		K10A 12" x 38-1/2" x Tape	630
1	Mop Plate		K10A 12" x 39" x Tape	630
1	Wall Stop		S120	626

HARDWARE SCHEDULE
Sherwood Library Renovation
London, Ont.

Heading #10

1 Pair of Doors	D124A	Multi-Purpose Room 122 From Storage/Catering Prep 124	RHRA/LHR
Type	A	2 = 4'-0" x 6'-8" x 1-3/4" x 1-3/4" HMD / HMF	
6	Hinges	T4A3786 5" x 4"	626
2	Flush Bolt	F-65 x UL	626
1	Dust Proof Strike	F-68	626
1	Storeroom Lockset	LC-8204 LNL x RHR	630
1	Mortise Cylinder	TBD - Confirm Keying Requirements	630
2	Conc. OH Stop	699-H x 95° (Hold Open)	626
2	Kick Plate	K10A 12" x 46-1/2" x Tape	630
2	Mop Plate	K10A 12" x 47" x Tape	630

Heading #11

1 Single Door	D125	Exterior From Ex. Shipping/Receiving 125	LHR
Type	A	Site Verify Existing Opening - New HMD / HMF	
1	Mortar Box	MB - Electric Strike	
1	Mortar Box	MB - Door Contact	
3	Hinges	T4A3386 4-1/2" x 4" NRP	630
1	Storeroom Lockset	LC-8204 LNL x LHR	630
1	Mortise Cylinder	TBD - Confirm Keying Requirements	630
1	Electric Strike	1006-CLB x 24VDC	630
1	Door Closer	351 PSH	EN
1	Armour Plate	K10A 36" x 36-1/2" x Tape	630
1	Threhsold	CT-10 x 38"	AL
1	Weatherstrip Set	W-16S x 17'-2"	CA
1	Door Sweep	W-24S x 38"	CA
1	Card Reader	By Security Provider	
1	Door Contact	By Security Provider	

Door Closer Has Stop - Template To Max. Degree Allowable Per Site Conditions

HARDWARE SCHEDULE
Sherwood Library Renovation
London, Ont.

Heading #12

1 Single Door	D127G-EX	Exterior From Corridor 127	RHR
Type A		Existing Door / Existing Frame	

Existing Door / Frame / Hardware To Remain

Part 1 General

1.1 SECTION INCLUDES

.1 Non-Thermally Broken Aluminum Framing Glazing Systems
.2 Thermally Broken Extruded Aluminum Glazing Systems
.3 Glazing Surface Films

1.2 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants

1.3 REFERENCE STANDARDS

.1 American National Standards Institute (ANSI):
  .1 ANSI Z97.1-2015, Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
.2 ASTM International (ASTM):
  .1 ASTM C542-05, Standard Specification for Lock-Strip Gaskets
  .2 ASTM C1503-18, Standard Specification for Silvered Flat Glass Mirror
  .3 ASTM D790-17, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
  .4 ASTM D1003-13, Standard Test Method for Haze and Luminous Transmittance of Plastics
  .5 ASTM D1929-20, Standard Test Method for Determining Ignition Temperature of Plastics
  .6 ASTM D2240-15e1, Standard Test Method for Rubber Property - Durometer Hardness
  .7 ASTM E84-20, Standard Test Method for Surface Burning Characteristics of Building Materials
  .8 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .9 ASTM F1233-08, Standard Test Method for Security Glazing Materials and Systems
.3 Canadian General Standards Board (CGSB):
  .1 CAN/CGSB-12.1-2017, Safety Glazing
  .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass
  .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass
  .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass
  .5 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors
  .6 CAN/CGSB-12.8-2017, Insulating Glass Units
  .7 CAN/CGSB-12.13-M91, Patterned Glass
.4 CSA Group (CSA):
.5 National Glass Association with GANA (NGA):
  .1 GANA Glazing Manual - 2008
.6 UL Canada (UL):
  .1 UL 752-2015, Standard for Bullet-Resisting Equipment
  .2 UL 2761-2011, Sealants and Caulking Compounds

.7 ULC Stamdards (ULC):
.1 CAN/ULC S102-10, Test for Surface Burning Characteristics of Building Materials and Assemblies
.2 CAN/ULC S104-10, Standard Method of Fire Tests for Door Assemblies
.3 CAN/ULC S106-15, Standard Method of Fire Tests of Windows and Glass Block Assemblies

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: Convene meeting 1 week before beginning work of this Section and on-site installation, with Contractor, Subcontractor and Consultant
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Coordination with other Subcontractors.
.4 Review manufacturer's written installation instructions and warranty requirements.
.2 Sequencing: Comply with manufacturer's recommendations for sequencing construction operations.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's instructions, product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish, and limitations.
.2 Submit WHMIS SDS.
.2 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
.3 Samples:
.1 Submit for review and acceptance of each type of unit.
.2 Samples will not be returned for inclusion into Work.
.3 Submit 300 x 300 mm size samples of and sealant material.
.4 Submit duplicate manufacturer samples of surface-applied glazing films.
.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
.1 Submit testing of glass under provisions of Section 01 43 00 - Quality Assurance.
.2 Submit shop inspection and testing for glass.

1.6 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section Section 01 77 00 - Closeout Procedures.
.2 Operation and Maintenance Data: Submit maintenance data for glazing and incorporate into manual.

1.7 QUALITY ASSURANCE

.1 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
.2 Mock-ups: Construct mock-ups in accordance with Section Section 01 43 00 - Quality Assurance.
  .1 Construct mock-up to include glass glazing.
  .2 Mock-up will be used:
    .1 To judge quality of work, substrate preparation, and material application.
  .3 Consultant will require minimum 24 hours to review the mock-up.
  .4 Approved mock-up may not remain as part of finished Work.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with Section Section 01 61 00 - Common Product Requirements.
.2 Storage and Handling Requirements:
  .1 Store materials off ground in a clean dry location and in accordance with manufacturer's recommendations.
  .2 Store and protect glazing from nicks, scratches, and edge damage.
  .3 Protect prefinished aluminum surfaces with wrapping.
  .4 Replace defective or damaged materials with new.

1.9 AMBIENT CONDITIONS

.1 Ambient Requirements:
  .1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.
  .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

Part 2 Products

2.1 MATERIALS

.1 Design Criteria:
  .1 Ensure continuity of building enclosure vapour and air barrier using glass and
  glazing materials as follow:
  .2 Utilize inner lite of multiple lite sealed units for continuity of air and vapour seal.
  .3 Size glass to withstand wind loads, dead loads and positive and negative live loads ASTM E330.
  .4 Limit glass deflection to 1/200 with full recovery of glazing materials.
  .5 Exterior glazing design and materials: to CSA Standard A460 for bird-friendly design.
.2 Flat Glass:
  .1 Float glass to: CAN/CGSB-12.3, glazing quality, 6 mm thick.
  .2 Sheet glass to: CAN/CGSB-12.2, AA-special selected, 6 mm thick
.3 Insulating Glass Units: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.
  .1 Glass: to CAN/CGSB-12.10.
  .2 Glass thickness: 6 mm outer lite and 6 mm inner lite.

.3 Inter-cavity space thickness: 13 mm air space with low conductivity spacers.
.4 Inert gas fill: argon.
.4 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
.1 VOC limit: 5% maximum by weight to UL 2761.
.2 Ensure sealant does not contain chemical restrictions to UL 2761.

2.2 GLAZING SURFACE FILMS

.1 Glazing Film: Polyester Film
.1 WG6: Opaque Glazing Film, refer to Interior Finishes
.2 Approved manufacturers:
.1 Window Film Systems
.2 Or approved equal.

2.3 ACCESSORIES

.1 Setting blocks: neoprene or EPDM, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square metre of glazing.
.2 Spacer shims: neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.
.3 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; 5 mm thick x 9.5 mm size; black colour.
.4 Glazing splines: resilient EPDM, extruded shape to suit glazing channel retaining slot, and colour to be black.
.5 Glazing clips: manufacturer's standard type.
.6 Lock-strip gaskets: to ASTM C542.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify conditions of substrates previously installed are acceptable for aluminum curtain wall installation in accordance with manufacturer's instructions.
.1 Verify dimensions, tolerances, and method of attachment with other work.
.2 Verify wall openings and adjoining air barrier and vapour retarder materials are
ready to receive work of this Section.
.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.
.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
.3 Prime surfaces scheduled to receive sealant.
.4 Preparation - Glazing films:
.1 Clean glazing before beginning installation using neutral cleaning solution.

.2 Ensure no deleterious material adheres to glazing.
.3 Ensure dust, grease, and chemical residue are removed from surface of glazing before installation of film.
.4 Examine glazing under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate or cause vision transparency or distortion problems.

3.3 INSTALLATION

.1 Install storefront assembly system in accordance with manufacturer's instructions and CAN/CSA-A440.6.
.2 Anchor to building structure to permit sufficient adjustment to accommodate construction
tolerances and other irregularities.
.3 Use alignment attachments and shims to permanently fasten system to building structure.
Clean weld surfaces; apply protective primer to site welds and adjacent surfaces.
.4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional
tolerances and align with adjacent work.
.5 Provide thermal isolation where components penetrate or disrupt building insulation.
.6 Install sill flashings
.7 Install eave edge flashings at sloped glazing system.
.8 Coordinate installation of fire stop systems, specified in Section 07 84 00 - Firestopping,
at each floor slab edge and intersection with vertical construction where indicated.
.9 Coordinate attachment and seal of perimeter air barrier and vapour retarder materials.
.10 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of
thermal barrier.
.11 Install operating sash in accordance with Section 08 80 00 - Glazing, to exterior
.12 Install glass and infill panels in accordance with Section 08 80 00 - Glazing, to exterior.
Place sealant on the up-slope side of the pressure plate cover caps; finish the surface
with a slope to encourage drainage over the cap.
.13 Install perimeter sealant to achieve required performance criteria. , backing materials,
and installation criteria in accordance with Section.

3.4 CLEANING

.1 Progress Cleaning:
.1 Remove traces of primer and sealants.
.2 Remove glazing materials from finish surfaces.
.3 Remove labels.
.4 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each lite with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants

1.2 REFERENCE STANDARDS

.1 Aluminum Association (AA)
- .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials (ASTM)
- .1 ASTM C475-02(2015), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .2 ASTM C514-04(2014), Standard Specification for Nails for the Application of Gypsum Board.
- .3 ASTM C557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
- .4 ASTM C840-16, Standard Specification for Application and Finishing of Gypsum Board.
- .5 ASTM C954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- .6 ASTM C1002-14, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- .7 ASTM C1047-14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .8 ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .9 ASTM C1178/C1178M-13, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .10 ASTM C1280-13a, Standard Specification for Application of Gypsum Sheathing.
- .11 ASTM C1396/C1396M-14a, Standard Specification for Gypsum board.

.3 Association of the Wall and Ceilings Industries International (AWCI)
- .1 AWCI Levels of Gypsum Board Finish-GA-214-2015.

.4 Canada Green Building Council (CaGBC)

.5 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.6 Green Seal Environmental Standards (GS)
- .1 GS-11-2008, 2nd Edition, Paints and Coatings.

.7 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC-S102-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Certifications:
  .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address and applicable standard designation.
.3 Exercise care in unloading gypsum board materials shipment to prevent damage.
.4 Storage and Handling Requirements in accordance with ASTM C 840-16:
  .1 Store gypsum board assemblies materials level flat off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
  .3 Protect gypsum board from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
  .4 Protect ready mix joint compounds from freezing, exposure to extreme heat and direct sunlight.
  .5 Protect from weather, elements and damage from construction operations.
  .6 Handle gypsum boards to prevent damage to edges, ends or surfaces.
  .7 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
  .8 Replace defective or damaged materials with new.

1.5 AMBIENT CONDITIONS

.1 Maintain temperature 10 °C minimum, 21 °C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimumafter completion of joint treatment.
.2 Apply board and joint treatment to dry, clean, frost free surfaces.
.3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 MATERIALS

.1 Standard board: to ASTM C1396/C1396M-1416, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.
.2 Gypsum sheathing board: to ASTM C1396/C1396M-14, 16, 1200 mm wide x maximum practical length.

.3 Fire rated gypsum sheathing board, Type 'X' 18mm, 1200 mm wide x maximum practical length
.4 Metal furring runners, hangers, tie wires, inserts, and anchors: to manufacturers recommendations..
.5 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
.6 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
.7 Steel drill screws: to ASTM C1002-14
.8 Laminating compound: as recommended by manufacturer, asbestos-free.
.9 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal,, 0.5 mm base thickness, perforated flanges, one piece length per location.
.10 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
    .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
    .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
.11 Polyethylene: to CAN/CGSB-51.34, Type 2
.12 Joint compound: to ASTM C475, asbestos-free

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.
    .1 Visually inspect substrate in presence of Consultant.
    .2 Inform Consultant of unacceptable conditions immediately upon discovery.
    .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from.

3.2 ERECTION

.1 Do application and finishing of gypsum board to ASTM C840-16 except where specified otherwise
.2 Do application of gypsum sheathing to ASTM C1280-13a
.3 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C840-16 except where specified otherwise
.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
.5 Install work level to tolerance of 1:1200.
.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, and fixtures.
.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
.8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
.9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
.10 Install wall furring for gypsum board wall finishes to ASTM C840-16, except where specified otherwise

.11 Furr openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
.12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
.13 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with [25] mm drywall screw.
.14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.3 APPLICATION

.1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
.2 Apply single layer gypsum board to metal furring or framing using screw fasteners, screw fasteners. Maximum spacing of screws [300] mm on centre.
  .1 Single-Layer Application:
    .1 Apply gypsum board on ceilings prior to application of walls to ASTM C840-16
    .2 Apply gypsum board on walls vertically or horizontally, providing sheet lengths that will minimize number of board edges or end joints.
  .2 Double-Layer Application:
    .1 Install gypsum board for base layer and exposed gypsum board for face layer.
    .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
    .3 Apply base layers at right angles to supports unless otherwise indicated.
    .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
.3 Apply double single layer gypsum board to concrete block and concrete surfaces, where indicated, using laminating adhesive.
  .1 Comply with gypsum board manufacturer's recommendations.
  .2 Brace or fasten gypsum board until fastening adhesive has set.
  .3 Mechanically fasten gypsum board at top and bottom of each sheet.
.4 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, ., in partitions where perimeter sealed with acoustic sealant.
.5 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
.6 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
.7 Install gypsum board with face side out.
.8 Do not install damaged or damp boards.

.9 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at [150] mm on centre.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated on drawings.

.9 Install control joints straight and true.

.10 Ensure that screws or nails are properly applied in process of attaching gypsum board to framing without damaging of gypsum board edges and ends.

.11 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.12 Install expansion joint straight and true.

.13 Install cornice cap where gypsum board partitions do not extend to ceiling.

.14 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.

.15 Splice corners and intersections together and secure to each member with 3 screws.

.16 Install access doors to electrical and mechanical fixtures specified in respective sections.

.1 Rigidly secure frames to furring or framing systems.

.17 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.18 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:

.1 Levels of finish:

.1 Level 0: no tapping, finishing or accessories required.

.2 Level 1: embed tape for joints and interior angles in joint compound. Surfaces free of excess joint compound; tool marks and ridges are acceptable.

.3 Level 2: embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.

.4 Level 3: embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.5 Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

.6 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.19 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.20 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.

.21 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.22 Completed installation smooth, level or plumb, free from waves and other defects and ready for surface finish.

.23 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.24 Mix joint compound slightly thinner than for joint taping.

.25 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.

.26 Allow skim coat to dry completely.

.27 Remove ridges by light sanding or wiping with damp cloth.

3.5 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM)
- .1 ASTM C645- 14e1, Standard Specification for Nonstructural Steel Framing Members.
- .2 ASTM A653/A653M- 07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
- .3 ASTM C754- 15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.2 Underwriter's Laboratories (UL)
- .1 UL-2768- 2011, Architectural Surface Coatings.

.3 The Master Painters Institute (MPI)
- .1 Architectural Painting Specification Manual - current edition.
  - .1 MPI #26, Primer, Galvanized Metal, Cementitious.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements

1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to Site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect metal framing from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Non-load bearing channel stud framing: to ASTM C645, 38mm, 92mm and mm stud size, roll formed from 0.91 mm thickness hot dipped zinc-coated (galvanized) steel sheet in accordance with ASTM A653, Z180, for screw attachment of gypsum board.
  .1 Knock-out service holes at 460 mm centres.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, and as follows:
  .1 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm on centre along length of runner; tested and certified for use in fire rated wall construction.
  .2 Double Runner Deflection Track: Outside runner using 75 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
  .3 Deep Leg Deflection Track: Top runner having 50 mm down standing legs; maintaining 13 mm minimum deflection space.
  .4 Base Runner: Bottom track with 33 mm upstanding legs.

.3 Furring Channels: Commercial steel sheet in accordance with ASTM A653, Z180, hot dipped zinc-coated (galvanized), as follows:
  .1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.75 mm thickness x 22 mm deep
  .2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).

.4 Curving Tracks: Commercial steel sheet with ASTM A653, Z180, hot dipped zinc-coated (galvanized), complete with flexible sliding straps to allow for curvature indicated on drawings; width to suit framing, and as follows:
  .1 Width: as indicated on drawings.
  .2 Minimum base metal thickness: 0.75 mm.

.5 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.

.6 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval to proceed from.

3.2 ERECTION

.1 Erect partitions in accordance with framing requirements of ASTM C754

.2 Align partition tracks at floor and ceiling and secure at 610 mm on centre maximum.

.3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.4 Place studs vertically at 400mm and or 610 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners.
  .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
.5 Erect metal studding to tolerance of 1:1000.
.6 Co-ordinate simultaneous erection of studs with installation of service lines. Align web openings when erecting studs.
.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified.
  .1 Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
.9 Install heavy gauge single jamb studs at openings.
.10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs.
  .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
  .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
.11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
.12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
.14 Extend partitions to ceiling height except where noted otherwise on drawings.
.15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
  .1 Use [50] mm leg ceiling tracks. Use double track slip joint.
.16 Install continuous insulating strips to isolate studs from uninsulated surfaces.
.17 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 CLEANING

.1 Progress Cleaning:
  .1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with manufacturers written instructions.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.
.2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Articulation Classification (AC): Indication of attenuation of sound being reflected from ceiling materials to adjacent areas in open plan areas, in accordance with ASTM E1111/E1111M.

.2 Ceiling Attenuation Class (CAC): Indication of amount of attenuation of sound passing up through a panel through the open plenum and back down through a panel into adjacent spaces where a partition is not full height, in accordance with ASTM E1414/E1414M.

.3 Light Reflectance (LR): The percentage amount of light returned from the surface of a material compared to the source.

.4 Noise Reduction Coefficient (NRC): Measure of the absorption of sound energy over four frequencies. An indication of the amount of noise a panel can absorb - measured in 0.05 increments in accordance with ASTM C423.

.5 Sound Absorption Average (SAA): Measure of the absorption of sound energy over twelve frequencies. An indication of the amount of sound a panel can absorb - measured in 0.01 increments in accordance with ASTM C423.

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM A580/A580M- 18, Standard Specification for Stainless Steel Wire

.2 ASTM A641/A641M- 19, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.3 ASTM C423- 17, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.4 ASTM C635/C635M- 17, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings

.5 ASTM C636/C636M- 19, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels

.6 ASTM E580/E580M- 20 Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions

.7 ASTM E1111/E111M- 14, Standard Test Method for Measuring the Interzone Attenuation of Open Office Components

.8 ASTM E1264- 19, Standard Classification for Acoustical Ceiling Products

.9 ASTM E1414/E1414M- 21a, Standard Test Method for Airborne Sound Attenuation between Rooms Sharing a Common Ceiling Plenum

.10 ASTM E1477- 98a, Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers

.11 ASTM F1667- 18a Standard Specification for Driven Fasteners: Nails, Spikes and Staples

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction

.3 Ceilings & Interior Systems Construction Association (CISCA):
.1 Ceiling Systems Handbook, 2019
.2 Seismic Construction Handbook, 2018
.4 CSA Group (CSA):
.1 CSA S832- 14, Seismic Risk Reduction of Operational and Functional Components (OFCs) of Buildings
.5 Government of Canada:
.1 Workplace Fit-Up Standards 2.0
.6 ULC Standards (ULC):
.1 CAN/ULC-S102- 10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.2 CAN/ULC-S702.1- 14, Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification

1.3 COORDINATION

.1 Do not begin installation of ceiling suspension system until work above ceiling has been reviewed by Consultant.

1.4 PRE-INSTALLATION MEETINGS

.1 Conduct pre-installation meeting at Project site one week before before beginning work of this Section and on-site installation, with contractor, applicable Subcontractors, and Consultant to:
.1 verify Project requirements,
.2 discuss coordination with work of other Sections,
.3 review manufacturer's installation instructions and warranty conditions,
.4 discuss and coordinate exact locations of ceiling-mounted components,
.5 discuss accepted shop drawings for special installation details, and
.6 review existing substrate conditions.

1.5 SEQUENCING

.1 Schedule installation of acoustical panel ceilings to occur after completion of overhead mechanical and electrical work, where possible.
.2 Begin installation after building envelope, and dust and moisture producing activities are complete, and paint is dry.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data: Submit manufacturer's installation instructions, product literature, and data sheets for ceiling suspension system, acoustic panels, and system accessories. Include product characteristics, performance criteria, physical sizes, finishes, and limitations.
.2 Shop Drawings:
.1 Submit reflected ceiling plans for special grid patterns as indicated on Drawings.
.2 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, change in

level details, access door dimensions and locations, lateral bracing and accessories.

.4 Samples for Initial Selection:
- .1 Submit actual samples of acoustical panel that are 150 mm x 150 mm showing full range of colours, textures, and patterns available.
- .2 Submit samples that are approximately 200 mm long of each ceiling suspension system component exposed to view showing full range of profiles, colours, and gloss levels.

.5 Samples for Verification:
- .1 Submit 150 mm x 100 mm samples of each type of acoustical panel.
- .2 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
- .3 Submit samples of each component proposed for use in each type of ceiling suspension system.

.6 Delegated Design Submittals:

.7 Test Reports: Submit test data indicating that fasteners and anchors used to suspend ceiling systems have a minimum capacity of 890 N in tension, and anchors to attach bracing wires have minimum a capacity of 1960 N in tension.

1.7 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section Section 01 77 00 - Closeout Procedures.

.2 Submit maintenance information for acoustical ceiling systems and incorporate into manual. Include warnings of cleaning methods that may damage finished surfaces.

.3 Submit final certificate from design professional responsible for delegated detail design of ceiling indicating conformity with accepted shop drawings.

1.8 MAINTENANCE MATERIAL SUBMITTALS

.1 Supply extra acoustical units in accordance with Section 01 77 00 - Closeout Procedures.

.2 Supply extra materials from same production run as installed materials.

.3 Supply acoustical units amounting to 2 % of gross ceiling area for each pattern and type of acoustical panel, ceiling suspension system and trim required for Project - minimum one complete factory-sealed package of each.

1.9 QUALITY ASSURANCE

.1 Certifications:
- .1 Fire-Resistance Rated Suspension System: Certified by a Canadian Certification Organization accredited by the Standards Council of Canada.
- .2 Submit manufacturer's product certificates, certifying materials comply with specified performance criteria and physical requirements. Include certification of sustainable requirements.

.2 Manufacturers: Obtain materials for each type of acoustical panel ceiling system (panels and suspension system) from a single manufacturer. Provide products exposed to view from the same production run for each room, with consistent appearance.

.1 Construct mock-up a minimum 10 m ^{2} of each type of acoustical ceiling assembly including one inside corner and one outside corner if applicable. Ceiling system mock-up to show basic construction and assembly, treatment at walls, splicing, interlocking, finishes, acoustical unit installation, one recessed light fixture, and one sprinkler head.
.2 Construct mock-up at Project site where directed by Consultant.
.3 Consultant will require a minimum 48 hours to review the mock-up.
.4 Mock-up may not remain as part of the finished work.

1.10 DELIVERY, STORAGE, AND HANDLING

.2 Storage and Handling Requirements:
.1 Store materials flat, off ground, indoors, and in a clean, dry, and well-ventilated area.
.2 Protect acoustical ceiling components from nicks, scratches, and other damage.

1.11 AMBIENT CONDITIONS

.1 Unless manufacturer's recommendations are more restrictive, maintain uniform temperature of 15 to 29 degrees C and relative humidity of 20 to 40 % for 48 hours before and during installation.
.2 Store materials in work area 48 hours before beginning installation.

1.12 WARRANTY

.1 Manufacturer Warranty:
.1 Coverage of manufacturing defects in materials and workmanship resulting in failure of suspension system for 15 years from date of Substantial Performance.

Part 2 Products

2.1 REGULATORY REQUIREMENTS

.1 Fire-Resistance Rated Acoustic Panel Ceilings: Meeting requirements of CAN/ULC-S102, labelled and listed by ULC Standards, Warnock Hersey Intertek (WHI), or another testing and inspecting agency acceptable to authorities having jurisdiction (AHJ).

2.2 DESIGN CRITERIA

.1 Superimposed Loads: Determine superimposed loads applied to ceiling suspension systems by components of the building and verify that adequate hangers are installed to support additional loads in conjunction with normal loads of the ceiling system, and as follows:
.1 Maximum Deflection: Limit deflection to L/360 in accordance with ASTM C635/C635M deflection test.
.2 Seismic Restraints: Design system to withstand seismic forces in accordance with CSA S832 and as outlined in applicable Building Code for post-disaster Importance Category facilities based on a full uniform ceiling load acceleration in accordance with ASTM A580/A580M. Ceiling areas less

than 13.4 m ^{2} and surrounded by walls connected to structure above do not require seismic restraints.

2.3 MATERIALS

.1 Classification: Heavy-Duty system to ASTM C635/C635M

2.4 ACOUSTICAL CEILING SUSPENSION

.1 Ceiling Suspension System ACT: Non-fire rated, made up as follows:
- .1 One- directional exposed tee-bar grid
- .2 Concealed tee access spline
- .3 Concealed tongue and groove runner
- .4 Concealed H-runner, tee spline and flat steel spline
- .5 Concealed zee runner and flat steel spline

.2 Materials for Suspension System: commercial quality cold rolled steel,

.3 Exposed Tee-Bar Grid Components: Components die cut. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection in matching colour to main tees. white colour.

.4 Hanger Wire: To ASTM A641/A641M, galvanized soft annealed steel wire:
- .1 Access Panel Ceilings: Minimum 3.6 -mm diameter

.5 Hanger Inserts: Purpose made.

.6 Accessories: Splices, clips, wire ties, retainers and wall moulding flush to complement suspension system components, and as recommended by system manufacturer.

.7 Seismic Components and Accessories: In accordance with reviewed shop drawings.

2.5 ACOUSTICAL CEILING TILES

.1 Lay-in acoustical tiles (ACT):
- .1 Classification: Type IV, Form 2, Pattern E, in accordance with ASTM E1264-19
- .2 Size: 609.6 mm x 609.6 mm (24” x 24”)
- .3 NRC: 0.80.
- .4 Material: Wet-formed mineral fibre with DuraBrite acoustically transparent membrane.
- .5 Surface texture: DuraBrite scrim with factory-applied latex paint.
- .6 Edge: Square lay-in.
- .7 Colour: White.
- .8 Flame spread:
  - .1 Flame Spread Value (FSV): 25.
    - .1 Smoke Developed Value (SDV): 50.
- .9 Acceptable Products:
  - .1 Armstrong ‘Ultima High NRC - 1940’.

Part 3 Execution

3.1 EXAMINATION

.1 Verify substrate conditions are acceptable for installation of acoustical ceiling panel and suspension system in accordance with manufacturer's instructions.

.1 Visually inspect substrates in presence of Consultant.
.2 Inform Consultant of unacceptable conditions immediately upon discovery.
.3 Proceed with installation after unacceptable conditions are remedied and after receipt of written approval to proceed from Consultant.

3.2 INSTALLATION - SUSPENSION SYSTEM

.1 Comply with manufacturer's installation instructions and recommendations, including product technical bulletins, installation instructions, and data sheets.
.2 Install suspension system in accordance with accepted shop drawings, Certification Organizations tested design requirements and ASTM C636/C636M except where specified otherwise.
.3 Install suspension system by suspending ceiling hangers from building's structural members, and as follows:
  .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  .2 Attach hangers to structural members or intermediate structural supports.
  .3 Fasten hangers to cast-in-place hanger inserts, powder actuated fasteners, or drilled in anchors that extend through forms into concrete.
  .4 Splay hangers only where required to miss obstructions. Offset resulting horizontal forces by bracing or counter-splaying.
.4 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter.
.5 Installation Tolerances: Finished ceiling system square with adjacent walls and level within 1:1000.
.6 Secure hangers to overhead structure using attachment methods acceptable to Consultant.
.7 Install hangers spaced at a maximum 1200 mm on centre and within 150 mm from ends of main tees.
.8 Coordinate suspension system with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above ceiling.
.9 Install wall moulding to provide correct ceiling height.
.10 Completed suspension system to support super-imposed loads, such as lighting fixtures , diffusers , grilles and speakers.
.11 Support light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at a maximum 610 mm around perimeter of fixture.
.12 Interlock or attach cross member to main runner to provide rigid assembly.
.13 Frame at openings for light fixtures, air diffusers, speakers, and at changes in ceiling heights.
.14 Install access splines to provide 25 % ceiling access.
.15 Expansion Joints:

3.3 INSTALLATION - ACOUSTICAL CEILING PANEL SYSTEM

.1 Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.

.2 Install panels with edges fully hidden from view by flanges of suspension system runners and mouldings.
.3 Install fibrous acoustical media and spacers over entire area above suspended metal panels.
.4 In fire-rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.4 SITE QUALITY CONTROL

.1 Site Tests and Inspections: Arrange for periodic site visits by design professional responsible for delegated ceiling design work to review installed work for conformity to design.
.2 Manufacturer Services: Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
.1 Submit written site reports within three days of visit.
.3 Non-Conforming Work:
.1 Do not support ceilings directly from permanent metal forms, floor deck, or other non-structural framing.
.2 Do not attach hangers to steel roof deck or steel deck tabs.
.3 Do not level ceilings by putting kinks in suspension wires. Kinks in suspension wires are not acceptable.
.4 Conceal fasteners including pop rivets on mouldings and trims.

3.5 CLEANING

.1 Progress Cleaning
.2 Final Cleaning: Cleaning, and touch-up
scratches, abrasions, voids, and other defects in painted surfaces.

3.6 PROTECTION

.1 Protect installed products from damage during construction.
.2 Repair damage to adjacent materials caused by acoustical suspension installation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Resilient Luxury Vinyl Tile Flooring
.2 Resilient base.
.3 Flooring accessories.

1.2 RELATED REQUIREMENTS

.1 Section 09 21 16 - Gypsum Board Assemblies: Wall materials to receive application of base.

1.3 REFERENCE STANDARDS

.1 ASTM E84-23c Standard test method for surface burning characteristics of building materials
.2 ASTM F1066-04(2018) Standard specification for vinyl composition floor tile
.3 ASTM F1303-04(2021) Standard specification for sheet vinyl floor covering with backing
.4 ASTM F1344-21a Standard specification for rubber floor tile
.5 ASTM F1700-20 Standard specification for solid vinyl floor tile
.6 ASTM F1859-21a Standard specification for rubber sheet floor covering without backing
.7 ASTM F1860-21a Standard specification for rubber sheet floor covering with backing
.8 ASTM F1861-21 Standard specification for resilient wall base
.9 ASTM F1913-19 Standard specification for vinyl sheet floor covering without backing
.10 ASTM F2034-18 Standard specification for sheet linoleum floor covering
.11 ASTM F2169-15(2020) Standard specification for resilient stair treads
.12 CAN/ULC-S102.2 - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

1.4 ACTION AND INFORMATION SUBMITTALS

.1 Product Data: Submit manufacturer's instructions, product literature, and data sheets for resilient flooring and accessories. Include product characteristics, performance criteria, dimensions, finishes, and limitations.
.2 Samples:
  .1 Samples for Initial Selection: Submit the following for Consultant 's initial selection of colours:
    .1 300 x 300-mm samples of each type of resilient sheet flooring .
    .2 Small samples of resilient base.
    .3 Samples of sheet flooring welding beads .
    .4 Samples of accessories where exposed to view.
  .2 Samples for Verification:
    .1 Submit 300 x 300-mm sample pieces of sheet material, 300-mm-long base.
  .3 Site Quality Control Submittals:

.1 Submit floor substrate test results prior to beginning flooring installation. Include comparison of sheet flooring manufacturer's acceptable alkaline level and recommended maximum moisture emission rates to site test results for each type of flooring.
.2 Submit information in accordance with NFCA QAP procedures and requirements. Submit inspection results and reports for review. When deviations from specified physical conditions or performance criteria are found, Do not proceed without written acceptance of Consultant.

1.5 CLOSEOUT SUBMITTALS

.1 Operations and Maintenance Data: Submit manufacturer's cleaning and repair recommendations in accordance with Section 01 77 00 - Closeout Procedures.
.2 Warranty Documentation: Submit manufacturer's warranties.
.3 Bonds: Submit floor covering Subcontractor's two-year maintenance bond for 100% value of this work.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials: Supply extra materials in accordance with Section 01 77 00 - Closeout Procedures, and as follows:
  .1 Supply minimum 2% of each colour, pattern and type of flooring material in full plank lengths for maintenance use.
  .2 Supply minimum 80m2 + 2% minimum LVT1 flooring material in full plank lengths for future install and maintenance use in EX. MEETING ROOM.
  .3 Supply 1220 mm of resilient base , in each specified colour and size.
  .4 Supply extra materials in one piece, and from the same production run as installed materials.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.
.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
.3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

.2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, with manufacturer's labels.
.3 Storage and Handling Requirements:
  .1 Store materials off ground, indoors, in a clean dry location, and in accordance
  with manufacturer's recommendations in well-ventilated area.
  .2 Store and protect materials from nicks, scratches, and blemishes.

1.9 SITE CONDITIONS

.1 Ambient Conditions:
  .1 Ambient Conditions: For 72 hours before installation, continuously during, and 72 hours after installation, maintain the following conditions, except when manufacturer's recommendations are more stringent:

.1 Ambient room temperature: 18 to 29 degrees C.
.2 Floor substrate temperature: minimum 15 degrees C.
.3 Relative humidity: 40 to 60%.

Part 2 Products

2.1 REGULATORY REQUIREMENTS

.1 Meet requirements of CAN/ULC S102.2 for required Flame Spread Ratings labelled and listed by ULC Standards or another agency acceptable to Authorities Having Jurisdiction (AHJ).

2.2 MATERIALS - RESILIENT TILE FLOORING

.1 Sheet luxury vinyl floor covering: to ASTM F1913, and as follows:
.1 LVT1: Plank luxury vinyl covering.
.2 Manufacturer: Tarkett, Event+ Wood Crafted Plank Series.
.3 Product Type: Class III, Type B, printed film vinyl tile , embossed surface
.4 Colour: as indicated on the drawings.
.5 Plank size: 152mm x 1219 mm (6" x 48")
.6 Installation method: glue down
.7 Installation pattern: as indicated on the drawings.
.8 Wear layer thickness: 30 mil (0.76 mm)
.9 Total thickness: 3.0 mm (0.120")
.10 Surface treatment: Techtonic scratch, scuff and abrasion resistance surface
.11 Edge Treatment: Square Edge (SE)

.2 Resilient Base: To ASTM F1861, with manufactured end stops and external corners, same dye lot for entire project and as follows:
.1 Type: Thermoplastic
.2 Style: Coved
.3 Thickness: 2.0 mm (0.07").
.4 Height: 100 mm (3.9").
.5 Lengths: manufactured in continuous rolls.
.6 Colour: as indicated on finish schedule.

2.3 ACCESSORIES

.1 Primer: Where recommended by sheet flooring manufacturer for site conditions and application.
.2 Concrete Moisture Emission Reducer: Moisture insensitive, epoxy modified, forming a permanent moisture barrier, water vapour permeability less than 6 ng/Pa·s·m when tested to ASTM E96 (wet method), other test methods will be considered.
.3 Adhesives: Types recommended by flooring manufacturer for substrate; above, on, or below grade.
.1 Cove base adhesives: Type recommended by base manufacturer to suit application.
.4 Sub-floor Filler and Leveler: 2-part latex-type filler requiring no water, as recommended by sheet flooring manufacturer.
.5 Heat Welding Bead: Solid strand product, recommended by sheet flooring manufacturer for heat welding seams, and as follows:
.1 Colour and pattern: Matching colour and pattern of resilient flooring.

.6 Chemical Bonding Compound: Type recommended by sheet flooring manufacturer for chemically bonding seams.

.7 Metal Transition and Edge Strips: Meeting CSA B651 for height and slope, stainless steel, mill finish with lip to extend under sheet flooring, shoulder flush with top of adjacent floor finish.

.1 Colour: As selected by the consultant.

.8 Resilient Transition and Edge Strips: Meeting CSA B651 for height and slope, extruded aluminum.

.1 Colour: As selected by the consultant.

.9 Edging at Floor Penetrations: Stainless steel, type recommended by flooring manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify concrete floors are dry to a maximum moisture content of 7%, and exhibit negative alkalinity, carbonization, or dusting.

.3 Verify floor and lower wall surfaces are free of substances that may impair adhesion of new adhesive and finish materials.

.1 Proceed with installation only after unacceptable conditions are remedied.

.4 Pre-installation Testing: Perform tests to verify concrete floors are dry, with low moisture vapour emission rate, and low alkalinity. Perform tests to ASTM F2170, except where sheet flooring manufacturer recommends more stringent test methods and requirements. Notify Consultant of testing date so they may choose to attend at their discretion.

.1 Perform adhesive bond test to cleaned concrete substrate, 1.0 x 1.0 m, allow to cure for 72 hours before evaluating bond strength.

3.2 PREPARATION

.1 Demolition: Remove existing resilient flooring.

.2 If concrete floor substrate vapour emissions exceed manufacturer's recommendations, prepare substrate in accordance with ASTM F3010.

.3 Prepare concrete floor substrates to ASTM F710.

.4 Remove subfloor ridges and bumps.

.5 Clean floor of dust, mould, mildew, alkaline salts, laitance, concrete film-forming curing compounds, paint, solvents, wax, oil, grease, residual adhesive, adhesive removing compounds, sealants, soap, and other foreign material.

.6 Fill low spots, cracks, joints, holes and other defects with sub-floor filler. Trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is dry and cured.

.7 Seal concrete slab to resilient flooring manufacturer's recommendations.

.8 Do not use permanent markers on floor substrates.

3.3 INSTALLATION - RESILIENT TILE FLOORING

.1 Install sheet flooring to manufacturer's written instructions.

.2 Install sheet flooring in pattern direction indicated on finish schedule.

.3 Provide high ventilation rate maximizing outside air during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let

contaminated air recirculate through building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.4 Luxury Vinyl Tile Flooring:
- .1 Install with manufacturer's adhesive specified for the site conditions and follow adhesive label for proper use.
- .2 Follow manufacturers recommendation for tile orientation.
- .3 Open enough cartons of floor tiles to cover each area, and mix tile to ensure shade variations do not occur within any one area.
- .4 Roll the flooring in both directions using a 100 pound three-section roller.

3.4 INSTALLATION - BASE

.1 Lay out resilient base to keep the number of joints at a minimum.
.2 Clean substrate and apply one coat of adhesive.
.3 Set resilient base against wall and floor surfaces tightly by using 3-kg hand roller.
.4 Install straight and level, to variation of 1:1000.
.5 Scribe, cut, and fit wall base to door frames and other obstructions. Install premoulded end pieces at flush door frames.
.6 Cope wall base at internal corners. Install formed straight wall base for external corners. Install formed straight wall base for non-90 degree corners.

3.5 SITE QUALITY CONTROL

.1 Site Inspections:
- .1 Third-party independent inspection agency: Provide services of a NFCA Accredited third-party independent inspection agency to conduct random inspections and issue reports during and after installation of floor covering. Inspections and reports in accordance with NFCA QAP - Part A04.

.2 Manufacturer's Site Services:
- .1 Mock-ups: Manufacturer to submit written confirmation that resilient sheet flooring installed meets or exceeds product requirements.
- .2 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and initial cleaning of product and submit Manufacturer's Site Reports.
- .3 Provide manufacturer's site services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 For specialty resilient flooring materials or systems, the manufacturer's representative shall review all surfaces and conditions for material applications and provide sufficient site reviews and reports to ensure installation conforms with the product warranty requirements.

3.6 CLEANING

.1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.
.2 Progress Cleaning:
.3 Final Cleaning:
- .1 Clean flooring base , and stair surfaces to manufacturer's recommendations.

3.7 PROTECTION

.1 Prohibit traffic on floor for a minimum of 48 hours after installation. Protect new floors until adhesive is fully cured.

.1 Where flooring areas will receive heavy traffic, rolling loads, or pallet jacks, protect flooring with 6-mm-thick temporary hardboard panels. Sweep or vacuum under panel areas prior to placement.

END OF SECTION

Tile Carpeting

Part 1 General

1.1 SECTION INCLUDES

.1 Carpet tile.
.2 Accessories.

1.2 RELATED REQUIREMENTS

.1 Section 09 65 00 - Resilient Flooring: Base finish.

1.3 REFERENCE STANDARDS

.1 ASTM D2859-16(2021) Standard test method for ignition characteristics of finished textile floor covering materials
.2 ASTM E84-21a Standard test method for surface burning characteristics of building materials
.3 ASTM E648-19ae1 Standard test method for critical radiant flux of floor-covering systems using a radiant heat energy source
.4 CAN/ULC-S102-18 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.5 CAN/ULC-S102.2-18 - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
.6 CRI 104 Carpet installation standard for commercial carpet
.7 NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source, 2019 Edition.

1.4 ACTION SUBMITTALS

.1 Section 01 33 00: Submission procedures.
.2 Product Data: Provide data on specified products, describing performance and physical characteristics; sizes, patterns, colours available, method of installation.
.3 Shop Drawings: Indicate layout of joint.
.4 Samples: Submit two (2) carpet tiles illustrating colour and pattern design for each carpet colour selected.

1.5 INFORMATIONAL SUBMITTALS

.1 Section 01 33 00: Submission procedures.
.2 Installation Data: Manufacturer's special installation requirements indicating special procedures, perimeter conditions requiring special attention.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.
.2 Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.
.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 SITE CONDITIONS

.1 Ambient Conditions:
- .1 Store materials for three (3) days prior to installation in area of installation, to achieve temperature stability.
- .2 Maintain minimum 21 degrees C ambient temperature three (3) days prior to, during and twenty-four (24) hours after installation materials.
- .3 Jobsite must be completely sealed (all exterior windows and doors properly installed) before beginning the installation process or before any floor preparations are performed

.2 Floor Coverings and Adhesive:
- .1 Must be acclimated to a temperature between 18.3°C and 29.4°C
  - .1 air humidity from 45% to 65% for at least 48 hours before, during, and continuously after the final installation

.3 Substrate Temperature:
- .1 Substrate temperature should be at least 5° F (-15°C) higher than the dew point. These conditions are best achieved with a functioning HVAC system.

.4 All carpet tiles must be removed from the cartons and allowed to adjust to the job site temperature for 48 hours prior to installation.

Part 2 Products

2.1 MANUFACTURERS

.1 Tarkett
.2 Interface
.3 Or approved equal.
.4 Substitutions: Refer to Section 01 25 00 - Substitution Procedures.

2.2 DESCRIPTION

.1 Regulatory Requirements:
- .1 Conform to applicable code for carpet flammability requirements of flooring in accordance with CAN/ULC-S102.2.
- .2 Verify applicability of the following tests to project requirements and requirements of authority having jurisdiction.
- .3 Conform to ASTM E648 Class II for flooring radiant panel test.
- .4 Conform to ASTM D2859 for surface flammability ignition test.

2.3 CARPET TILE

.1 Carpet Tile CT1, Product: Interface, Up At Dawn series, conforming to the following:
- .1 Product Specifications:
  - .1 Tile Size: 25cm x 1m (9.8" x 39.3")
  - .2 Colour: as indicated on drawings.
  - .3 Installation pattern: as indicated on drawings.
  - .4 Pattern: as indicated on drawings.
  - .5 Pile Height: 3.60 mm (0.14").
  - .6 Pile Thickness: 2.10 mm (0.08").

.2 Performance Specifications:
.1 Smoke Density to: (ASTM E-662) ≤ 450
.2 Flammability passes: Methenamine Pill Test (DOC-FF1-70)
.3 Lightfastness: (AATCC 16 - E) ≥ 4.0 @ 60 AFU's
.4 Static: (AATCC - 134) < 3.0 KV
.5 Traffic Classification: Severe, 1.9 to 2.2
.3 Warranty: 15 year standard carpet warranty

.2 Carpet Tile CT2, Product: Interface, Reflectors series, conforming to the following:
.1 Product Specifications:
.1 Tile Size: 25 cm x 1m (9.8" x 39.3")
.2 Colour: as indicated on drawings.
.3 Installation pattern: as indicated on drawings.
.4 Pattern: as indicated on drawings.
.5 Pile Height: 3.60 mm (0.14").
.6 Pile Thickness: 2.40 mm (0.10").
.2 Performance Specifications:
.1 Smoke Density to: (ASTM E-662) ≤ 450
.2 Flammability passes: Methenamine Pill Test (DOC-FF1-70)
.3 Lightfastness: (AATCC 16 - E) ≥ 4.0 @ 60 AFU's
.4 Static: (AATCC - 134) < 3.0 KV
.5 Traffic Classification: Severe, 1.9 to 2.2
.3 Warranty: 15 year standard carpet warranty

.3 Carpet Tile CT3, Product: Interface, Ice Breaker series, conforming to the following:
.1 Product Specifications:
.1 Tile Size: 50 cm x 50 cm (19.6" x 19.6").
.2 Colour: as indicated on drawings.
.3 Installation pattern: as indicated on drawings.
.4 Pattern: as indicated on drawings.
.5 Pile Height: 3.30 mm (0.13").
.6 Pile Thickness: 1.80 mm (0.07").
.2 Performance Specifications:
.1 Smoke Density to: (ASTM E-662) ≤ 450
.2 Flammability passes: Methenamine Pill Test (DOC-FF1-70)
.3 Lightfastness: (AATCC 16 - E) ≥ 4.0 @ 60 AFU's
.4 Static: (AATCC - 134) < 3.0 KV
.5 Traffic Classification: Heavy, 1.7 to 1.9
.3 Warranty: 15 year standard carpet warranty

.4 Carpet Tile CT4, Product: Interface, Panola Mountain series, conforming to the following:
.1 Product Specifications:
.1 Tile Size: 50 cm x 50 cm (19.6" x 19.6").
.2 Colour: as indicated on drawings.
.3 Installation pattern: as indicated on drawings.
.4 Pattern: as indicated on drawings.
.5 Pile Height: 7.40 mm (0.29").
.6 Pile Thickness: 5.90 mm (0.23").

.2 Performance Specifications:
.1 Smoke Density to: (ASTM E-662) ≤ 450
.2 Flammability passes: Methenamine Pill Test (DOC-FF1-70)
.3 Lightfastness: (AATCC 16 - E) ≥ 4.0 @ 60 AFU's
.4 Static: (AATCC - 134) < 3.0 KV
.5 Traffic classification: Severe, 1.9 to 2.2

2.4 ACCESSORIES

.1 Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
.2 Primers and Adhesives: Compatible with carpet material.
.3 Backing: As specified by the manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.
.2 Verify that surfaces are smooth and flat with maximum variation of 6 mm in 3 m, and are ready to receive work.
.3 Verify concrete floors are dry to a maximum moisture content of 7%; and exhibit negative alkalinity, carbonization, or dusting.

3.2 PREPARATION

.1 Prepare floor to CRI-104.
.2 Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
.3 Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
.4 Vacuum clean substrate.
.5 Existing concrete floors shall comply with manufactures moisture and PH requirements. Testing to ASTM F2170.
.1 Obtain certificates of calibration should be maintained for test validation
.6 Inspect interface carpet tiles to be sure they meet the order specifications. If the wrong product or color is installed.

3.3 INSTALLATION

.1 Install carpet tile, accessories and adhesive to manufacturer's written instructions.
.2 Install carpet tile accessories and adhesive in accordance with manufacturer's written instructions.
.3 Integrate and blend carpet from different cartons to ensure minimal variation in colour match.
.4 Cut carpet tile clean. Double cut roll carpet seams straight. Fit carpet tight to intersection with vertical surfaces without gaps.
.5 Lay carpet tile to pattern and tile direction indicated on the drawings.
.6 Locate change of colour or pattern between rooms under door centerline.
.7 Fully adhere carpet tile to substrate.
.8 Place carpet tile dry over substrate.
.9 Bind cut edges where not concealed by edge strips.

.10 Extend carpet tile as base finish up vertical surfaces to form base. Terminate top of base with cap strip.

3.4 CLEANING

.1 Cleaning installed work.
.2 Remove excess adhesive without damage, from floor, base, and wall surfaces.
.3 Clean and vacuum carpet surfaces.

3.5 PROTECTION

.1 Do not permit traffic over unprotected floor surface.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Surface preparation.
.2 Painting.

1.2 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrications: Shop primed items.
.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with other Work having a direct bearing on Work of this section.
.2 Scheduling:
  .1 Schedule painting operations to prevent disruption of and by other trades.
  .2 Schedule painting operations to prevent disruption of occupants in and about building.

1.4 ACTION SUBMITTALS

.2 Product Data:
  .1 Submit Product data on all specified finishing products.
  .2 Submit electronic copies of WHMIS MSDS - Material Safety Data Sheets.
.3 Samples:
  .1 Submit two (2) samples, 300 mm x 300 mm in size illustrating range of colours and textures available for each surface finishing product scheduled.
  .2 Submit two (2) samples, 300 mm x 300 mm in size illustrating selected colours and textures for each colour selected.

1.5 INFORMATIONAL SUBMITTALS

.2 Installation Data: Manufacturer's special installation requirements including special surface preparation procedures and substrate conditions requiring special attention.
.3 Schedule:
  .1 If requested, submit Work schedule for various stages of Work when painting occupied areas for Consultant’s review and Owner’s approval.
  .2 Submit schedule minimum of forty-eight (48) hours in advance of proposed operations.
  .3 Obtain written authorization from Consultant for changes in Work schedule.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 77 00 - Closeout Procedures.
.2 Record Documentation: Upon completion, provide itemized list of products used including the following:
  .1 Manufacturer's name.
  .2 Product name, type and use.
  .3 Colour coding number.

.4 Manufacturer's Material Safety Data Sheets (MSDS).

1.7 MAINTENANCE MATERIAL SUBMITTALS

.2 Extra Stock Materials: Provide properly packaged maintenance material as follows.
- .1 1 gal of each coating type and colour to Owner.
- .2 Label each container with colour, type, texture and room locations in addition to manufacturer's label.

1.8 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

.2 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience.

.3 Conform to MPI Painting Manual requirements for materials, preparation and workmanship.

.4 Paint Products: Paint manufacturers and paint Products listed under the Approved Product List section of the MPI Painting Manual.

1.9 MOCK-UPS

.2 If requested, provide 2.4 m long by 2.4 wide field sample panel as specified, illustrating specified coating colour, gloss, texture, and workmanship.

.3 Locate where directed by Consultant.

.4 Approved mock-up will be the acceptable standard of finish quality and workmanship for all painting Work.

.5 Approved mock-up may remain as part of the Work.

1.10 DELIVERY, STORAGE, AND HANDLING

.1 Transport, handle, store, and protect products.

.2 Deliver products to site in sealed and labeled containers showing manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, colour designation, and written instructions for mixing and reducing.

.3 Store paint materials at minimum ambient temperature of 7 degrees C and a maximum of 32 degrees C, in dry, ventilated area and as required by manufacturer's written instructions.

.4 Provide adequate fireproof storage lockers and warnings as required by authorities having jurisdiction for storing toxic and volatile/explosive/flammable materials.

1.11 SITE CONDITIONS

.1 Ambient Conditions:
- .1 Do not perform painting or decorating Work when ambient air and substrate temperatures are below 10 degrees C for both interior and exterior work, or as required by paint product manufacturer.
- .2 Do not perform painting or decorating Work when relative humidity is above 85% or when dew point is less than 3 degrees C variance between the air/surface temperature required by paint Product manufacturer.

.3 Provide suitable weatherproof covering and sufficient heating facilities to maintain minimum ambient air and substrate temperatures for twenty-four (24) hours before, during and after paint application.

.4 Do not perform painting and decorating Work when maximum moisture content of substrate exceeds:

.1 Wood: 15%.

.2 Plaster and Gypsum Wallboard: 12 %.

.5 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple cover patch test.

.6 Test concrete, masonry and plaster surfaces for alkalinity as required.

.7 Provide minimum lighting level of 323 lux is provided on surfaces to be painted or decorated.

1.12 WASTE MANAGEMENT AND DISPOSAL

.1 Dispose of waste materials in accordance with Local authorities having jurisdiction.

.2 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.3 Place non-reusable materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.4 To reduce contaminants entering waterways, sanitary/storm drain systems or into the ground, adhere to the following procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Dry out empty paint cans prior to disposal or recycling.

.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

.5 Set aside and protect surplus and uncontaminated finish materials and deliver or arrange collection for verifiable re-use or re-manufacturing.

1.13 WARRANTY

.1 Provide local 100% two (2) year Maintenance Bond warranting that Work has been performed in accordance with MPI Painting Manual.

Part 2 Products

2.1 DESCRIPTION

.1 Regulatory Requirements:

.1 Conform to applicable code for flame and smoke rating requirements for finishes, storage, mixing, application and disposal of paint and related waste materials.

2.2 MATERIALS

.1 Use only materials (primers, paints, coatings, varnishes, stains, lacquers, fillers) listed in the latest edition of the MPI Approved Product List (APL) on this project.
.2 Ancillary materials such as linseed oil, shellac, thinners, solvents to be of highest quality product and provided by an MPI listed manufacturer, and compatible with paint materials being used.
.3 Where required, use only materials having a minimum MPI "Environmentally Friendly" E1 rating based on VOC (EPA Method 24) content levels.
.4 Where indoor air quality (odour) is an issue, use only MPI listed materials having a minimum E3 rating.
.5 Where possible, all materials to be lead and mercury free with low VOC content.
.6 Provide all material for each system from a single manufacturer.
.7 Fire Hazard: Flame spread and smoke developed ratings in accordance with applicable code.
.8 Patching Materials: Latex filler.

2.3 MIXING AND TINTING

.1 Coatings: Ready-mixed and pre-tinted; re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
.2 Paste, Powder or Catalyzed Paint: Mixed in accordance with manufacturer's written instructions.
.3 Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
  .1 Do not exceed paint manufacturer's recommendations for addition of thinner. Do not use kerosene or any such organic solvents to thin water-based paints.
  .2 Thin paint for spraying in accordance with paint manufacturer's instructions.

2.4 FINISH AND COLOUR

.1 Colours and Finishes: Refer to Finish Schedule to be provided after award of Contract.

2.5 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as the sheen rating of applied paint with the following values:

Gloss Level	Description	Gloss @ 60 degrees	Sheen @ 85 degrees
G1	Matte Finish (flat)	0 to 5	10 max.
G2	Velvet-Like Finish	0 to 10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Satin-Like Finish	20 to 35	35 min.
G5	Traditional Semi-Gloss Finish	35 to 70	

G6	Traditional Gloss	70 to 85	
G7	High Gloss Finish	More than 85	

.2 Gloss level ratings of painted surfaces as specified.

2.6 MANUFACTURERS

.1 Paint Manufacturers:
- .1 Benjamin Moore Paints'.
- .2 ICI Paints, (Gliddedn Company Limited.
- .3 Pratt and Lambert Inc.
- .4 Para Paints.
- .5 PPG Industries.
- .6 Substitutions: Refer to Section 01 25 00.

2.7 INTERIOR PAINT SYSTEMS

.1 Plaster, Gypsum Board:
- .1 One (1) coat of high hide Primer/Sealer, equal to Dulux Paints/PPG Architectural Coatings -Pert Interior Latex Primer/Sealer '11000' primer sealer.
- .2 Two (2) coats of latex acrylic enamel, eggshell or semi-gloss finish.

2.8 INTERIOR PAINT SYSTEMS

.1 Paint interior surfaces in accordance with the following MPI Painting Manual requirements.

.2 Structural Steel and Metal Fabrications: (columns, beams, joists, etc.).
- .1 INT 5.1CC: Water based dry fall finish (over quick dry shop primer).

.3 Galvanized Metal: (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.).
- .1 INT 5.3D: Epoxy finish (over epoxy primer).

.4 Plaster and Gypsum Board: (gypsum wallboard and textured finishes).
- .1 INT 9.2A: Latex (over latex sealer), G5 finish.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify that substrate conditions are ready to receive work as instructed by the product manufacturer.

.3 Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

.4 Test shop applied primer for compatibility with subsequent cover materials.
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.

3.2 PREPARATION

.1 Prepare surfaces in accordance with MPI requirements.

.2 Remove and store or mask miscellaneous hardware and surface fittings such as electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to painting. Clean and replace upon completion of painting Work in each area. Remove doors before painting to paint bottom and top edges and re-hung.

.3 Protect adjacent surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, from painting operations with drop cloths, shields, masking, templates, or other suitable protective means.

.4 Correct defects and clean surfaces which affect work of this section. Start of finish painting of defective surfaces indicates acceptance of substrate and making good defects will be at no cost to Owner.

.5 Confirm preparation and primer used with fabricator of steel items.

.6 Seal with shellac and seal marks which may bleed through surface finishes.

.7 Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

.8 Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

.9 Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

.10 Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

.11 Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

.12 Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

3.3 APPLICATION

.1 Apply paint or stain in accordance with MPI Painting Manual Premium Grade finish requirements.

.2 Apply products to adequately prepared surfaces, within moisture limits and acceptable environmental conditions.

.3 Apply paint finish in areas where dust is no longer being generated or when wind or ventilation conditions will not affect quality of finished surface.

.4 Apply each coat to uniform finish.

.5 Tint each coat of paint progressively lighter to enable confirmation of number of coats.

.6 Unless otherwise approved, apply a minimum of four (4) coats of paint where deep or bright colours are used to achieve satisfactory results.

.7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm.

.8 Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

.9 Allow applied coat to dry before next coat is applied.

.10 Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

.11 Continue paint finish behind wall-mounted items such as chalk and tack boards.

.12 Prime concealed surfaces of interior woodwork with primer paint.

3.4 FIELD QUALITY CONTROL

.1 Inspection and Testing:

.1 Provide inspection by Paint Inspection Agency (inspector) acceptable to the specifying authority for interior surfaces.

.2 Acceptable Surfaces:

.1 No visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.

.2 No visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.

.3 No visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.

.4 Uniformity of colour, sheen, texture, and hiding across full surface area.

3.5 CLEANING

.1 Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

END OF SECTION

Protective Wall Covering

Part 1 General

1.1 SECTION INCLUDES

.1 Sheet plastic wall finish.

1.2 RELATED REQUIREMENTS

.1 Section 07 92 00 - Joint Sealants.
.2 Section 09 21 16 - Gypsum Board Assemblies: Support channels between metal studs.

1.3 REFERENCE STANDARDS

.1 ASTM E84-21a Standard test method for surface burning characteristics of building materials
.2 CAN/ULC-S102-18 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 ACTION SUBMITTALS

.1 Product Data: Data sheets on the physical properties of the sheet plastic, adhesives required, and limitations of the Product.
.2 Samples: Submit two (2) samples illustrating each colour required and finish.
.3 Shop drawings:
  .1 Include plans, elevations, hardware, and installation details.
  .2 Show seam locations.

1.5 INFORMATIONAL SUBMITTALS

.1 Installation Data: Manufacturer's special installation requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Protect pre-finished surfaces with wrapping.

Part 2 Products

2.1 SHEET WALL PROTECTION (SWP1)

.1 Acceptable Manufacturers:
  .1 Construction Specialties Acrovyn 1.5 mm (.060") high impact rigid vinyl sheeting,
  complete with joint molding, outside corner and inside corner moldings.
.2 Furnish as complete package with primers and adhesives (water based) for adhering sheeting.
.3 Colours for wall protection: as indicated on drawings.
.4 Accessories: manufacturer's standard adhesive and mounting hardware.
.5 Adhesives: Type as recommended by wall protection manufacturer suitable and compatible with materials and substrates.
.6 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
.7 Substitutions: refer to Section 01 25 00 - Substitution Procedures.

2.2 DESCRIPTION

.1 Construction Specialties Acrovyn 1.5 mm (.060") high impact rigid vinyl sheeting, complete with joint molding, outside corner and inside corner moldings. Furnish as complete package with primers and adhesives (water based) for adhering sheeting. Colours for wall protection shall be selected from Acrovyn standard colour selectors.

2.3 MATERIALS

.1 Plastic Wall Finish:
- .1 Wall Protection: SWP1 as follows:
- .2 Sheet Size: as per manufacturers available sheet sizes, single sheet per location.
- .3 Thickness: 1.5 mm.
- .4 Finish: Colour and finish texture, selected by Consultant.

.2 Moulding: Extruded plastic profiles, wainscot trim, internal and external corner moulding, colour to match sheet.

.3 Primer and Adhesive: To manufacturer's written instructions, compatible with substrate and any fillers used.

2.4 SEALANT MATERIALS

.1 Sealant and Backing Materials: As specified in Section 07 92 00 of Types described below.

.2 Perimeter Sealant: Type Type as recommended by wall protection manufacturer suitable and compatible with materials and substrates.

Part 3 Execution

3.1 EXAMINATION

.1 Verify dimensions, tolerances, and method of attachment of other work.

.2 Ensure flatness of substrate surface is equivalent to a flat wall surface.

3.2 PREPARATION

.1 Use appropriate surface filler to bring substrate surface to a flat condition.

3.3 INSTALLATION

.1 Install plastic wall surfacing to manufacturer instructions.

.2 Install inside corner trim securely, set sheeting into reveals.

.3 Cap top and bottom of sheeting.

.4 Use joint moulding where wall width exceeds sheet width.

.5 Site cut sheeting to fit precisely around openings and protruding wall accessories.

.6 Install from finished floor surface to height as indicated on Drawings high.

3.4 CLEANING

.1 Remove protective material from surfaces.

.2 Wash down surfaces:
- .1 With a solution of mild detergent in warm water.
- .2 Applied with soft, clean wiping cloths.
- .3 Take care to remove dirt from corners.
- .4 Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 92 00 Joint Sealants.

1.2 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-44.40-01, Steel Clothing Locker.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:
  .1 Provide manufacturer's printed product literature and data sheets for through wall book depositories, and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Shop Drawings:
  .1 Indicate on drawings: type and class of depository, thickness of metal, fabricating and assembly methods.
.3 Samples:
  .1 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.
  .2 Samples will be returned for inclusion into work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
.2 Delivery and Acceptance Requirements:
  .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
.3 Storage and Handling Requirements:
  .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  .2 Store and protect book depositories from nicks, scratches, and blemishes.
  .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Thru-wall, depository, mechanically fastened into place. Kingsley Model 10-8951 , provide with Model 50-800 fire deterrent chute and lock, prefabricated from Type 304 stainless steel.
.2 Description:
  .1 Rough Opening: 403.2 mm (15.875") wide x 304.8 mm (12") tall
  .2 Overall Dimensions:
    .1 Width: 508 mm (20")
    .2 Depth: 438.15 mm (17.25")
    .3 Height: 330.2 mm (13")

.4 Depository Opening: 381 mm (15") wide x 95.25 mm (3.75") high

.3 Assembly:

.1 Chute Interior: Heavy-duty stainless steel with aluminum grade aluminum

.2 Front Plate: Heavy-duty stainless steel with aluminum grade aluminum

.3 Caulking: Caulk around perimeter of front plate in accordance with Section 07 92 00 Joint Sealants.

.1 Weather Resistance: Caulking inside edges of the faceplate and install weather stripping around door for increased protection from inclement weather.

.4 Air Draft Prevention: AirBloc System

.5 Mounting screws, installed from inside of the unit

.4 Mounting Height: 1219.2 mm (48") min. from Finished Floor to underside of depository opening.

.5 Maximum wall thickness: 355.6 mm (14")

.3 Manufacturers:

.1 Kingsley Library Equipment

.2 or approved equal.

2.2 ACCESSORIES

.1 Locking system: supplied by depository manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive metal lockers previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal locker installation.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Consultant.

3.2 INSTALLATION

.1 Assemble and install depositories in accordance with manufacturer's written instructions.

.2 Securely fasten depositories as per manufacturer's written instructions.

.3 Install filler panels (false fronts) where indicated and where obstructions occur.

3.3 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with manufacturers written instructions.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by depository installation.

END OF SECTION